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A MEMOIR

ON THE

CULTIVATION OF THE VINE

IN

AMERICA,

AND THE

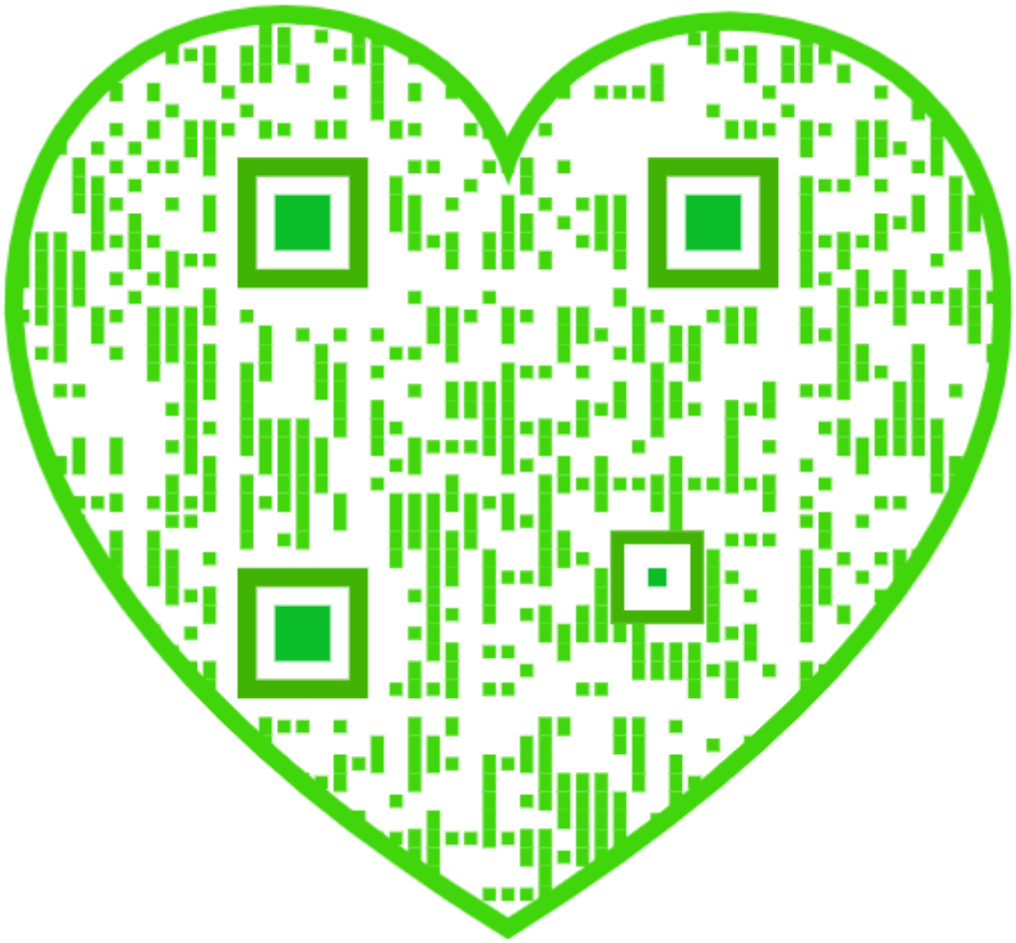
BEST MODE OF MAKING WINE.

BY JOHN ADLUM.

"Wine is as good as life to a man, if it be drunk moderately; what is life then to a man that is without wine? for it was made to make men glad.
"Wine measurably drank, and in season, bringeth gladness of the heart, and cheerfulness of the mind."

ECCLESIASTICUS, c. 31, v. 27, 28.

WASHINGTON:
PRINTED BY DAVIS AND FORCE, (FRANKLIN'S HEAD,)
PENNSYLVANIA AVENUE.
1823.



DISTRICT OF COLUMBIA, TO WIT:

BE IT REMEMBERED, That on the first day of March, in the year of our Lord one thousand eight hundred and twenty-three, and of the Independence of the United States of America the forty-seventh, John Adlum, of the said District, hath deposited in the Office of the Clerk of the District Court of the District of Columbia, the title of a book, the right whereof he claims as Author and Proprietor, in the words following, to wit:

"*A Memoir on the Cultivation of the Vine in America, and the Best Mode of Making Wine. By John Adlum.*

"Wine is as good as life to man, if it be drunk moderately; what is life then to a man that is without Wine? for it was made to make men glad.

"Wine measurably drank, and in season, bringeth gladness to the heart, and cheerfulness of the mind" Ecclesiasticus, c. 31, v. 27, 28.

In conformity to the Act of the Congress of the United States, entitled "An Act for the encouragement of learning, by securing the copies of Maps, Charts, and Books, to the Authors and Proprietors of such copies, during the times therein mentioned;" and also to the Act, entitled "An Act supplementary to an Act, entitled 'An Act for the encouragement of learning, by securing the copies of Maps, Charts, and Books, to the Authors and Proprietors of such copies during the times therein mentioned,' and extending the benefits thereof to the arts of designing, engraving, and etching, historical and other prints."

[L. S.] IN TESTIMONY WHEREOF, I have hereunto set my hand, and affixed the public seal of my office, the day and year aforesaid.

EDM. I. LEE,

Clerk of the District Court for the District of Columbia

Gift
Tappan Presb. Ass'n
11-19-1931

PREFACE.

The following little Work has been prepared for the purpose of diffusing some practical and useful information throughout the country, on the best method of cultivating the native Grape, and of making Wine. The writer has, for a number of years, devoted his time and attention to this highly interesting subject; and, he flatters himself, he will be enabled, from his long experience, and the numerous experiments he has made, to throw out some new and additional lights, to those who wish to understand this valuable, but too much neglected, branch of Agriculture. Its importance and utility must be obvious to every one who gives the least reflection to the subject. Almost every species of Grape to be found in our widely extended country, is capable, by proper cultivation, of yielding a Wine superior to the best Cyder, as a wholesome beverage, and equal to most imported Wines. These, however, from the progress of improvement, and the rapid increase of population, are diminishing daily, and will, finally, if not attended to in time, become altogether extinct. It was to prevent this evil, (as far as I could be instrumental in preventing it,) that I wished to obtain of the President of the United States, a few years ago, a lease of a portion of the public ground in the City, for the purpose of forming a Vineyard,

and of cultivating an experimental farm. It was my intention, had I been successful, to procure cuttings of the different species of the native Vine, to be found in the United States, to ascertain their growth, soil, and produce, and to exhibit to the Nation, a new source of wealth, which had been too long neglected. My application was, however, rejected, and I have been obliged to prosecute the undertaking myself, without assistance and without patronage, and this I have done to the full extent of my very limited means. A desire to be useful to my countrymen, has animated all my efforts, and given a stimulus to all my exertions. It is this desire, in connexion with a wish to satisfy the numerous enquiries that have been made on this subject, that I have been led to undertake the present work, which, I hope, will induce others to follow my example in cultivating the Vine, and be the means of spreading a knowledge of the subject among my fellow-citizens. As I am advancing in years, and know not when I may be called hence, I am solicitous that the information I have acquired should not die with me. It will be proper to state, that on the cultivation of the Vine, I have made several extracts from Miller's Dictionary; but with such alterations, as will suit our practice and climate. From Forsythe, I have also taken and have subjoined my own practice—and from some valuable essays, published in the Intelligencer, and supposed to be written by Tench Coxe, Esq. of Philadelphia, on

the value of the Vineyard, and crops of Wine in France, and the manner of making Wine, &c. in Spain, I have taken the liberty to extract largely, and have added my own experience for the greater benefit of those who feel disposed to cultivate the Grape in this country.

For the method of making Wine, I am indebted to M'Culloch of England, for many valuable hints, and much useful information. He has thrown more light upon this branch of the subject than any author I have read, and from him I have taken several extracts, under the impression that their diffusion would be highly useful to the citizens of this country, as far north, as the Grape may be found to grow naturally. If, however, it should be discovered that the climate is too cold to enable the best kind of Grapes to ripen, a Wine may be manufactured from the unripe or immature Grape, with the addition of sugar, resembling the Champaign, and which, in my opinion, will be found as palatable, and much more wholesome, than most of wretched stuff, sold under the names of Champaign and Claret.

JOHN ADLUM.

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A MEMOIR

ON

THE CULTIVATION OF THE VINE.

TO PROPAGATE VINES FROM SEEDS.

When Vines are to be raised from seeds, they should be sowed the latter end of February, or beginning of March, or they may be sowed as late as the middle of April; but the earlier the better, in rows, in borders, or in beds. Sow the seed thin in rich, light earth, (well spaded and raked,) about an inch deep, and if the weather is dry, water them occasionally, and when the seeds begin to vegetate, the plants should be watered in the evenings in dry weather. When the plants are six inches high, they should be carefully tied to rods, leaving only one stem the first year; the rods should be nearly as high as the Vines are likely to grow the first season. When the leaves begin to drop, pull off all as they turn yellow, so that the wood may ripen well.

About the latter end of March, the next season, they may be planted out where they are intended to remain, and they should be cut off to the

third eye, if very strong, but only to the second, if weak; rubbing off the lower bud with the finger and thumb. And afterwards, they are to be managed as the cuttings that are planted in the Vineyard. But it is to be observed, that the Vines propagated from seed, do not all bear fruit, probably not more than the half of them; therefore if they are strong growing Vines, I would advise to engraft all the barren ones.

PROPAGATION AND CULTURE OF GRAPES FOR THE TABLE.

All sorts of Grapes are propagated either from seeds, layers, or cuttings. The latter is what I would recommend as being much preferable to the others; for the roots of Vines do not grow strong and woody, as in most sorts of trees, but are long, slender and pliable; therefore when they are taken out of the ground, they seldom strike out any fibres from their weak roots, which generally shrivel and dry; so that they rather retard than help the plants in their growth, by preventing the new fibres from pushing out; for which reason I had rather plant a good cutting than a rooted plant, provided it be well chosen, and there is little danger of its not growing.

But as there are few persons who make choice

of proper cuttings, or at least that form their cuttings rightly, so it will be proper to give directions for this in the first place, before I proceed. You should always make choice of such shoots as are strong, with short joints, and well ripened of the last year's growth; which should be pruned smooth; then you should cut off the upper part of the shoots, so as to leave the cutting about sixteen inches long.

When the cuttings are thus prepared, if they are not then planted, they should be placed with their lower part in the ground in a dry soil, laying some litter on their upper parts, to prevent them from drying: in this situation they may remain until the middle of March, or beginning of April, when you should take them out, and wash from them the filth they have contracted; and if you find them very dry, you should let them stand with their lower parts in the water six or eight hours,* which will distend their vessels, and dispose them for taking root. Then the ground being before prepared where the plants are designed to remain (whether against walls or standards, for it is best not to remove them again) the cuttings should be planted; but in preparing the ground, you should consider the nature of the soil, which, if strong and inclinable to wet, is by

* Mr. M'Mahon in his book on gardening, recommends cow-dung to be mixed with the water. J. A.

no means proper for Grapes: therefore, where it so happens, you should open the trench where the cuttings are to be planted, which should be filled with lime, rubbish, brick-bats, or stones, the better to drain off the moisture: then raise the border with fresh light earth about two feet thick, so that it may be at least a foot above the level of the ground; then you should open the holes at six feet distance from each other, putting one good strong cutting in each hole, which should be laid a little sloping, that their top may incline from the sun, but it must be put in so deep, as that the uppermost eye may be level with the surface of the ground; for when any part of the cutting is left above ground, as is the common method used by the English gardeners, most of the buds attempt to shoot; so that the strength of the cuttings are divided to nourish so many shoots, which must be consequently weaker than if only one of them grew; whereas, on the contrary, by burying the whole cutting in the ground, the sap is all employed on one single shoot, which consequently will be much stronger; besides the sun and air are apt to dry that part of the cutting which remains above ground, and so often prevents their buds from shooting.

Then, having placed the cuttings in the ground, you should fill up the hole gently; pressing down the earth with your foot close about it, and raise

a little hill just upon the top of the cutting, to cover the upper eye quite over, which will prevent it from drying; this being done, there is nothing more necessary, but to keep the ground clear from weeds until the cuttings begin to shoot; at which time you should look over them carefully to rub off any small shoots, if such are produced, fastening only the first main shoot to the wall, stake, &c. as may be, which should be constantly trained up, as it is extended in length, to prevent its breaking or hanging down: you must continue to look over these once in about three weeks during the summer season, constantly rubbing off all lateral shoots which are produced, leaving only the first main shoot; and be sure to keep the ground constantly clear from weeds, which, if suffered to grow, will exhaust the goodness of the soil, and starve the cuttings.

The Michaelmas following,* if your cuttings have produced strong shoots, you should prune them down to two eyes, (first rubbing off the lower one) which by some people may be thought too short, yet I am satisfied from several experiments, to be the best method. The reason for advising the pruning, at this season, rather than deferring till spring is, because the tender parts of those young

* Michaelmas is on the 29th of September. In this climate I think it would be best to defer pruning a week or ten days longer. J. A.

shoots, if left on, are subject to decay in winter, or they are apt to grow late in the year, so the tops of their shoots are tender, and the early frosts will pinch them, and then they frequently are killed down a considerable length, which weakens their roots;* but if they are cut off early in autumn, the wounds will heal over before the bad weather, and thereby the roots will be greatly strengthened.

In the spring, after the cold weather is past, you must gently dig up the borders to loosen the earth; but you must be very careful in doing this, not to injure the roots of the Vines; you should also raise the earth up to the stems of the plants, so as to cover the old wood, but not so deep as to cover either of the eyes of the last year's wood. After this they will require no further care until they begin to shoot, when you should look over them carefully, to rub off all weak, dangling shoots, leaving no more than two, which are produced from the eyes of last year's wood, which should be fastened to the wall, stake, &c. and from this time until the Vines have done shooting, you should look them over once in three weeks or a month, to rub off all the lateral shoots as they are produced, and to fasten up the main shoots as they are extended in length, which must not be

* Mr. Forsythe is opposed to pruning in Autumn, and recommends the month of February. J. A.

shortened before the middle or latter end of July,* when it will be proper to nip off their tops, which will strengthen the lower eyes; and during the summer season, you must constantly keep the ground clear from weeds, nor should you permit any sorts of plants to grow near the Vines, which would not only rob them of nourishment, but shade the lower part of the shoots, and thereby prevent their ripening, which will not only cause the wood to be spongy and luxuriant, but render it less fruitful.

As soon as the leaves begin to drop in the autumn, you should prune these young Vines again, leaving three buds to each of the shoots (always bearing in mind to rub off the lower one) provided they are strong, otherwise it is better to shorten them down to two eyes if they are good; for it is a very wrong practice to leave much wood upon young Vines, or to leave their shoots too long, which greatly weakens the roots; then you should fasten them up to the wall, stakes, &c. spreading them out horizontally each way, that there may be room to train the new shoots the following summer, and in the spring dig the borders as before.

* In our climate it will not answer to shorten the Vines in July, as it will cause them to throw out new shoots from the eyes that are to bear fruit the next year. It is therefore best to let them grow to full length. J. A.

The third season you must go over the Vines again as soon as they begin to shoot, to rub off all danglers as before, and train their strong shoots in their proper places, which this year may be supposed to be two from each shoot of the last year's wood; but if they attempt to produce two shoots from one eye, the weakest of them must be rubbed off,* for there should never be more than one allowed to come out of each eye. If any of them produce fruit, as many times they will the third year, you should not stop them so soon as is generally practised upon the bearing shoots of the old Vines, but permit them to shoot forward till a month after mid-summer, at which time you may pinch off the tops of the shoots; for if they were done too soon, it would spoil the buds for next year's wood, which in young Vines must be more carefully preserved than on older plants, because there are no other shoots to be laid in for a supply of wood, as is commonly practised on old Vines.

During the summer, you must constantly go over your Vines, and displace all weak lateral shoots as they are produced, and carefully keep the ground clear from weeds, as was before directed, that the shoots may ripen well; which is a material thing to be observed in most sorts of fruit trees,

* There is frequently two shoots from one bud, the lower one which is always the weakest, should be rubbed off. J. A.

but especially Vines, which seldom produce any fruit from immature branches. These things being duly observed, are all that is necessary in the management of young Vines; I shall therefore proceed to lay down rules for the government of grown Vines, which I shall do as briefly as possible: and,

First. Vines rarely produce any bearing shoots from wood that is more than a year old, therefore great care should be taken to have such wood in every part of the Vine; for the fruit is always produced from the shoots of the same year, which come out from the buds of the last year's wood. The method commonly practised is, to shorten the branches of the last year's growth, down to three or four eyes, at the time of pruning; though there are some persons who leave these shoots much longer, and affirm by this practice they obtain a greater quantity of fruit; but however this may be, it is a very wrong practice, since it is impossible that one shoot can nourish forty or fifty bunches of Grapes, so well as it can ten or twelve; so that what is gotten in number, is lost in their magnitude; besides the greater quantity of fruit there is left on the Vines, the later they are ripened, and their juice is not so rich; and this is well known in the Wine countries, where there are laws enacted to direct the number and length of shoots that are to be left upon each Vine, lest by

over bearing them, they not only exhaust and weaken the roots, but thereby render the juice weak, and so destroy the reputation of the Wine.

Wherefore, the best method is to shorten the bearing shoots to about four eyes in length, because the lowermost seldom is good, and three buds are sufficient, for each of these will produce a shoot, which generally has two or three bunches of Grapes; so that from each of those shoots there may be expected from six to eight bunches, which is a sufficient quantity. These shoots must be laid about eighteen inches asunder, for if they are closer, when the side shoots are produced, there will not be room enough to train them against the trellis, &c. which should always be provided for; and as their leaves are very large, the branches should be left at a proportionable distance from each other, that they may not croud or shade the fruit.

At the winter pruning of your Vines, you should always observe to make the cut just above the eye, sloping it backward from it, that if it should bleed, the sap might not flow on the bud, and where there is an opportunity of cutting down some young shoots, to two eyes, in order to produce vigorous shoots for next year's bearing, it should always be done, because in stopping of those shoots which have fruit upon them, as soon as the Grapes are formed, which is frequently practised, it often spoils the eyes, for producing bearing branches

the following year, and this reserving of new wood is what the Vignerons abroad always practice in their Vineyards. The best season for pruning of Vines is the end of October, for the reasons before laid down.*

In April, or beginning of May, when the Vines begin to shoot, you must carefully look them over, rubbing off all the small buds which may come from the old wood, which only produce weak dangling branches; as also when two shoots are produced from the same bud, the weakest of them should be displaced, which will cause the others to be stronger; and the sooner this is done, the better it is for the Vines.

In the middle of May, you must go over them again, rubbing off all the dangling shoots as before, and at the same time, you must fasten up all the strong branches; for if the shoots hang down, their leaves will be turned with their upper surfaces the wrong way, and when the shoots are afterwards trained upright, they will have their under surface upwards; and until the leaves are turned again, and have taken their right position, the fruit will not thrive: so that the not observing this management, will cause the Grapes to be a fortnight or three weeks later before they ripen; besides they will be shaded by the closeness of the branches, will greatly retard their growth; therefore

* Forsythe recommends Feb'y as the best season for pruning.

during the growing season, you should constantly look over the Vines, displacing all dangling branches, and wild wood, and fasten up the other shoots regularly, as they are extended in length; and towards the middle of June, you should stop the bearing branches,* which will strengthen the fruit, provided you always leave three eyes above the bunches; for if you stop them too soon, it will injure the fruit, by taking away that part of the branch which is necessary to attract the nourishment to the fruit, as also to perspire off the erudities of the sap, which is not proper for the fruit to receive.

But although I recommend the stopping those shoots which have fruit at this season, yet this is not to be practised upon those which are intended for bearing next year, for those must not be stopped before the middle of July,† lest by stopping them too soon, you cause the eyes to shoot out strong, lateral branches, whereby they will be greatly injured.

During the summer season, you should be careful to rub off all dangling branches, and train up the shoots regularly, to a trellis or wall as before, which will greatly accellerate the growth of the fruit, and also admit the sun and air to them, which

* In this climate these bearing Vines ought not to be stopt until July. J. A.

† As I observed before, the Vines ought not to be stopped, but suffered to grow at full length. J. A.

is necessary to ripen and give the fruit a rich flavour; but you must never divest the branches of their leaves, as in the practice of some persons: for although the admitting of the sun must be necessary to ripen them, yet if they are too much exposed thereto, their skins will be tough, and it will retard their ripening; besides, the leaves being absolutely necessary to nourish the fruit, by taking them off, *the fruit is starved*, and seldom comes to any size, as I have several times observed; therefore, a great regard should be had to the summer management of the Vines, where persons are desirous to have their fruit excellent and duly ripened.

When the fruit is all gathered, you should prune the Vines, whereby the litter of their leaves will be entirely removed at once, and their fruit will be forwarder the succeeding year.*

ON GRAFTING VINES.

At the pruning season, make choice of cuttings for grafts or scions from the best bearing branches

* Vines may be very easily propagated from the young green shoots of the season, as soon as they are long enough to lay down; dig a hole between the rows and lay in the young shoots, leaving a few inches of the top above ground fastening it down with a hooked peg or some other thing to keep it in its place, then fill the hole with rich light earth, and water it well; that is every other day for a week, when it will have taken root; and as it grows it must be tied to a stake to keep it from breaking, and the next season it may be pruned and removed at your pleasure. J. A.

of the sorts intended to be propagated. In general the bottom part of the last year's shoot is to be preferred; but in well ripened vigorous wood, any part of the shoot will answer, provided it be not too long jointed. These cuttings should be preserved in pots filled with light sandy earth, till the grafting season.

Vines growing in the open air should be grafted from the middle of March to the first of April. In general they should be grafted about three weeks before they begin to break into bud.

Upon small stocks, not more than an inch diameter, cleft grafting is most proper; but upon larger stocks, whip grafting is to be preferred. In both methods care should be taken in fitting the stock and scion together, and the operation should be performed with great exactness. Fasten them together with bass-matting, and cover them with clay the usual way.

Though the scion will sometimes begin to push in a few weeks, yet it will frequently remain dormant two or three months; during this period the stock must be striped of all its shoots, as soon as they appear; and to preserve the scion in a vegetative state, the clay must be kept moderately moisted, by wrapping wet moss around it, and by keeping the moss constantly sprinkled with water.

When the scion has made shoots five or six inches long, the clay and bandage should be carefully taken off.

But the most eligible method of grafting, is by approach. In which case it is necessary, to have the plant intended to be propagated, in a pot. Strong plants that have been two or three years in pots, are to be preferred; but plants from the nursery may be potted, and grafted in the same season if brought into a hot house or vinery.

Fine Grapes and good wood may be obtained in the first season, by any of these methods, but particularly by the last; in which it is obvious that the graft has a double support; namely, from the stock, and from the plant in the pot.

In grafting by approach, the clay and bandage should remain two or three months after the graft has formed an union; for if it be taken off sooner, the graft will be very liable to spring from the stock. The pot should be plentifully supplied with water till the month of August, when the graft should be separated from the plant in the pot. Two or three inches of the wood below the bottom of the graft may be left, but should be taken clean off at the next year's winter pruning.

The strongest growing Vines are most proper for stocks, and plants raised from seeds of very strong growing Vines, are to be preferred to plants raised either from layers or cuttings for this purpose. If the produce of the seed should even degenerate, they will still be better for stalks, because they will, on that account, grow with greater vigour.

The most important advantages of grafting are, first: That if you have bad kind of Vines planted, instead of stubbing them up, and planting others, by which several years will elapse, before you can have their places filled with bearing Vines; by grafting, the nature of the Vines are changed immediately; for good grapes may be obtained from the same year's graft, which will grow from fifteen to thirty feet in length, in the first summer. Secondly. Where you have not room for a great variety, they may be procured by grafting different kinds on the same plant.

But the principal advantage of grafting, is the improvement of the various kinds, and particularly the small ones, which generally make weak wood. This may be done by grafting the weak and delicate growing Vines, upon the stocks of those which are more robust and vigorous. Thus the small blue Frontinac engrafted on the Syrian Vine, produces well sized handsome bunches, with berries almost as large as those of the black Hamburgh.*

* I would advise country gentlemen to engraft the hardiest kinds of foreign grapes as well as the best native ones on the wild native stock. For there are very few situations in the country, south of 40° of latitude, that does not produce wild vines; there is scarcely a mile square in any part of the country, where they are not to be found; and where they grow in the fields or gardens, or near the house, the experiment can be easily tried: and if it should succeed, it will be a great acquisition to the table at least, if not for making wine.

ON PLANTING VINEYARDS.

The first great thing to be considered in planting a Vineyard, is the choice of soil and situation, which, if not rightly chosen, there will be but little hopes of success, for upon this the whole affair greatly depends. The best soil for a Vineyard, is such whose surface is a light sandy loam, and not above a foot and a half or two feet deep, above the gravel or rock, either of which bottoms are equally good for Vines; but if the soil is deep, and the bottom either a clay or strong loam, it is not so proper for this purpose; for although the Vines may shoot vigorously, and produce a great quanty of Grapes, yet they will be later ripe, fuller of moisture, and so consequently their juice not mature, nor well digested, but will abound with crudity; which in fermenting, will render the Wine sour and ill tasted, which is the common complaint of those who have made Wine in England.*

*I am indoced to think that these observations do not apply to this country, for our summers are much warmer here than in England or France, and vegetation much more rapid. For instance, according to Mrs. Legeuax's table, (see M'Mahon's Gardener.) The Munier Grape, commonly called the Miller Burgundy, or Blue English Grape, does not ripen inFrance upon an average, earlier than the first of October, and at his Vineyard near Spring Mill, a few miles from Philadelphia, the average is the first of September in ripening. I have had them for six years in this district, and the latest they were ripening, was the

Nor is a very rich, light, deep soil, proper for this purpose; because the roots of these Vines are enticed down too deep to recieve the influence of the sun and air, and hereby will take much crude nourishment, whereby the fruit will be rendered less valuable, and be later ripe, which is of ill consequence to those fruits which are known to imbibe a great share of their nourishment from the air, which if replete with moisture, must necessarily contribute greatly to render the juices less perfect; therefore, great attention should be had to the nature of the soil, upon which they are planted.

The next thing necessary to be considered, is

15th of August; this last year, 1822, they ripened on the 4th of the month. So that we have at least one month's advantage, and may let our Grapes hang on the Vines until they begin to shrivel, and consequently, they will lose a great proportion of their aqueous particles. I made a Wine of the Schuylkill Muscadell, (near Havre-de-Grace, where the Vines grow on a rich loam well manured, and with a clay bottom;) which was pronounced equal to the best Wine of France. And this was not complimentary, but a fact; for it was put upon the table with one of the best Wines that France produces; and no one could tell which was the French, or which was American; neither could they perceive any difference. It is but proper to remark, that I never made quite such good Wine since, owing to some accidental and unaccountable circumstance, in the making of the first. But I have always made a decent Wine, as good, if not better, than most imported Wine, the high priced ones excepted. But no doubt such Wine may be made of the same Grape again, in the hands of a skilful Vigneron or Wine cooper. J. A.

the situation of the place, which if possible, should be on the north side of a river, upon an elevation inclining to the south, with a small gradual descent, that the moisture may the better drain off; but if the ground slopes too much, it is by no means proper for this purpose; but if, at a distance from this place, there are larger hills, which defend it from the north and north-west winds, it will be of great service, because hereby the sun's rays will be reflected with greater force, and the cold winds being kept off, will render the situation very warm.

The country should be open and hilly, for if there are many trees, or low and boggy, the air will constantly be filled with moist particles, occasioned by the plentiful perspiration from the trees, or the exhalations from the adjoining marshes, whereby the fruit will be greatly prejudiced. The Vineyards should always be open to the east, that the morning sun may come on them, to dry off the moisture of the night early, which by lying too long upon the Vines, greatly retard the ripening of the fruit, and renders it crude and ill-tasted. And since the fruit of the Vines is seldom or rarely injured by easterly winds, there will be no reason to apprehend any danger from such a situation, the north and north-west winds being the most injurious. So that if possible, they ought to be sheltered therefrom.*

* I have found the top of the hill where there is a free circu-

Having made choice of soil and situation proper for this purpose, the next thing is to prepare it for planting. In doing of which the following method should be observed: In the spring it should be ploughed as deep as the surface will admit, turning the sward into the bottom of the furrow; after this, it should be well harrowed, to break the clods, and cleanse it from the roots of noxious weeds, and it must be often ploughed, and harrowed for at least one year, to render the surface light; and hereby it will be rendered fertile, by imbibing the nitrous particles of the air, (especially if it be long exposed thereto, before it is planted;) then in March, the ground should be well ploughed again, and after having made the surface pretty even, the rows should be marked out from south-east to north-west, at the distance of twelve feet from each other; and these rows should be crossed again at five or six feet distance, which will mark out the exact places where each plant should be placed; so that the Vines will be

ation of air, the best for the more delicate foreign Grapes; the Miller Burgundy and White Sweet Water, ripen well with me on the top of the hill near my house, while the same Grapes growing within less than twenty perches on the side hill, crack and burst, owing, as I suppose, from the heat of the sun and earth; even on the top of the hill, all within between two and three feet of the ground, are subject to the like malady, while those at four feet and upwards from the ground, ripen well and come to the greatest perfection. J. A.

twelve feet row from row, and five or six feet asunder in the rows, nearer than which, they ought never to be planted. And herein most people who have planted Vineyards have greatly erred, some having allowed not more than five feet from row to row, and the plants but three feet asunder in the rows; and others, who think they have been full liberal in this article, have only planted their Vines at six feet distance every way; but neither of these have allowed a proper distance to them, as I shall show: for in the first place, where the rows are placed too close, there will not be room for the sun and air to pass in between them to dry up the moisture, which being detained amongst the Vines, must produce very ill effects: and, secondly, where the Vines are placed in exact squares, so near together as six feet, there can be no room for the current air to pass between them, when their branches are extended on each side, and so, consequently, the damps will be entangled and detained amongst the Vines, to the great prejudice of the fruit; and all proper care should be taken to remove every thing that may obstruct the drying up of the damps which arise from the ground.

The skilful Vignerons abroad, are also sensible how much it contributes to the goodness of their Vines, to allow a large space between the rows, and therefore, where the quality of the Wine is more regarded than the quantity, there they never

plant their Vines at less than ten feet row from row; but it is better to allow twelve. It was an observation of Bellonius, two hundred years since, that in those islands of the Archipelago, where the rows of the Vines were placed at a great distance, the Wine was much preferable to those which were close planted; and this he positively affirms to be the case in most countries where he has travelled. Indeed we need not have recourse to antiquity for the certainty of such facts, when we are daily convinced of this truth in all close plantations of any kind of fruit, where it is constantly observed, that the fruits in such places are never so well coloured, so early ripe, nor so well flavoured, as those produced on trees, where the air can freely circulate about them, and the rays of the sun have free access to the branches; whereby the juices are better prepared before they enter the fruit.

Having thus considered the distance which is necessary to be allowed to these plants, we come next to the planting: but in this, the proper sorts of Grapes should be judiciously chosen; and in this particular, we generally err most egregriously; generally planting the sweetest and best Grapes for eating, which is contrary to the practice of Vignerons abroad, who always observe that such Grapes never make good Wine; and therefore, from experience, make choice of those sorts of

Grapes, whose juice after fermenting, affords a noble and rich liquor; which Grapes are almost always observed to be austere, and by no means palatable. This is also agreeable to the constant practice of our Cider-makers, who always observe, that the best eating apples, make but poor Cider; whereas the more rough and austere sorts, after being pressed and fermented, afford a strong vineous liquor. And I believe it will be found true in all fruits, that where the natural heat of the sun ripens and prepares their juices, so as to render them palatable, whatever degree of heat these juices have more, either from fermentation, or from any other cause, will render the Vine weaker and less spirituous. Of this we have many instances in fruits; for if we transplant any of our Summer or Autumn fruits, which ripen perfectly in England, without the assistance of art, into a climate a few degrees warmer, these fruits will become mealy and insipid: so, likewise, if we bake or stew any of those fruits, they will be good for little, losing all their spirit and flavour by the additional heat of the fire; and such fruits by no means eatable raw, are hereby rendered exquisite, which, if transplanted into a warmer climate, have, by the additional heat of the sun, been also altered, so as to exceed the most delicious of our fruit in this country.

From whence, it is plain, that those Grapes which are most agreeable to the palate for eating,

are not proper for wine ; in making of which, their juices must undergo a strong fermentation ; therefore, since we only propagate the most palatable Grapes for eating, and neglect the other sorts, before we plant Vineyards, we should take care to to be provided with proper sorts." Of which I have five kinds, of each of which I have made good Wine, viz. *The Bland Madeira, Schuylkill Muscadell, Constantia, Tokay, and the Worthington.*

Of the Bland Madeira, I have made a Wine equal to most White Wines, the best Madeira only excepted ; and of the Schuylkill Muscadell, I have made a Wine, pronounced by good judges, to be "Worthy the best Vineyards of France."

Some foreign Vignerons plant three or four kinds of Vines in the same Vineyard, and at the time of vintage, mix them all together ; which renders the Wine less delicate, than in such places where they have only one sort of Grape. And here I would caution every one against mixing the juice of several Grapes together, which will cause the Wine to ferment at different times, and in different manners.

But I would advise every person who may have, or plant a Vineyard, to make the Wine of every kind of Grape separately, for after it has gone through its first fermentations, you can then discover, by mixing small quantities in glasses, whether they will be improved or not, and act accordingly. But if you happen to make Wine very

good, be cautious of mixing it with any Wine of an inferior kind, *but let it be sacred.* You may sometimes mix your inferior Wines to a decided advantage.

The cuttings being provided (for I would always prefer them to layers or rooted plants) from the middle of March, to the first week in April, as the best season for planting, though I have planted them as late as the first week in May, when it will be proper to put the lower ends of the cuttings in water about five or six inches, setting them upright for six or eight hours before they are used; then at the centre of every cross mark, already made by a line, to the distance the Vines are designed, should be made a hole with a spade, or other instrument, about a foot or fifteen inches deep, into each of which should be put one strong cutting, placing it a little sloping: then the hole should be filled up with rich earth, pressing it gently with the feet to the cutting, and raising a little hill to each, about three inches, so as just to cover the upper eye or bud, which will prevent the wind and sun from drying any part of the cutting, and this upper eye will only shoot, the under ones most of them will push out roots so that this shoot will be very strong and vigorous.

After they are thus planted, they will require no other care until they shoot, except to keep the ground clear from weeds, which should be

constantly observed; but as the distances between the rows are very great, so the ground between them may be sowed or planted with any kind of esculent plants, which do not grow tall, provided there is a proper distance left from the Vines, and care taken that the Vines are not injured by the crops, or in the gathering, and carrying them off the ground; and this husbandry may be continued two or three years, till the Vines come to bearing; *after which time there should be no sort of crop put between them in summer, because the cleaner the ground is kept between the Vines from weeds and plants, the more the Grapes will thrive.* When the cuttings begin to shoot, there should be a stake four or five feet long stuck down by each, (but it will be best to do that when the cuttings are planted) to which the shoot should be fastened, to prevent their breaking or laying on the ground: so that as the shoots advance, the fastening should be renewed, and all small lateral shoots (if any such are produced) should be constantly displaced, and the ground between the Vines always kept clean. This is the whole management which is required the first summer.

But at Michaelmas,* when the Vines are done shooting, they should be pruned; for if they are

* Michaelmas is the 29th of September. In this climate about the 10th of October would be better.

left unpruned until Spring, their shoots being tender (especially towards the upper parts) will be in danger of suffering if the winter should prove severe.

This pruning, after rubbing off the lower eye, is to cut down the shoot to two eyes; and if after this is done, the earth be drawn up in a hill about each plant, it will be a greater defence against the frost.

At the beginning of March, the ground between the Vines should be well dug, to loosen it, and render it clean; but you must be careful not to dig deep too close to the Vines, lest thereby their roots should be cut or bruised, and at the same time the earth should be again laid up in a hill to each plant; but there must be care taken not to bury the two young eyes of the former year's shoot, which were left to produce new wood.

At the beginning of May, when the Vines are shooting, there should be two stakes fixed down to the side of each plant, about five or six feet high, above the ground; to these the two shoots (if so many are produced) should be fastened, and all the small trailing or lateral shoots should be constantly displaced, that the other shoots may be stronger, and the ground should also be kept very clear of weeds as before.

The Autumn following, these Vines should be pruned again, in the following manner: those

which have produced two strong shoots of equal vigour, must be cut down to three or four eyes each, bearing in mind to rub off the lower one; but in such as have a strong shoot and a weak one, the strong one must be shortened to three or four eyes, and the weak one to two; and such Vines as have produced but one strong shoot, should be shortened down to three eyes, also in order to obtain wood against the succeeding year.

In the Spring, about the beginning of March, the ground between the Vines should again be dug, as before, and two stakes should be placed down by each of the Vines that have two shoots, at such distance on each side of the plant as the shoots will admit to be fastened thereto, and the shoots should be drawn out on each side of the stakes, so as to make an angle of about forty-five degrees with the stem; but by no means should they be bent down horizontally, as is by some practised, for the branches lying too near the earth, are generally injured by the damps which arise from thence, but especially when they have fruit, which is never so well tasted, nor so early ripe upon those branches, as when they are a little more elevated.

In May, when the Vines begin to shoot, they must be attentively looked over, and all weak dangling shoots, carefully rubbed off as they are produced, and those shoots which are pro-

duced from strong eyes, should be fastened to the stakes, to prevent their being broken off by the wind.

This management should be repeated at least every three weeks, from the beginning of May, to the end of July: by which means the shoots which are trained up for the succeeding year, will not only be stronger, but also better ripened and prepared for bearing, because they will have the advantage of the sun and air, which is absolutely necessary to prepare their juices; whereas, if they are crouded by a number of small, dangling, weak branches, they will shade and exclude the rays of the sun from the other shoots; and so by detaining the moisture a longer time amongst the branches, occasion the vessels of the young wood to be of larger dimensions; and hereby the crude juice finds an easy passage through them, so that the shoots in Autumn seem to be mostly pith, and are of a greenish, immature nature, and wherever this is observed, it is a sure sign of the bad quality of the Vines. The soil also should constantly be kept clean, because if there are any vegetables (either weeds or plants of other kinds) growing between the Vines, it will detain the dews longer, and by their perspiration, occasion a greater moisture than would be, if the ground were entirely clear; so that those who plant

other things between their rows of Vines, are guilty of a great error.

In Autumn, the Vines should be pruned, which season I approve of rather than Spring, (for reasons before given) and this being the third year from planting, the Vines will now be strong enough to produce fruit, therefore they must be pruned accordingly. Now, suppose the two shoots of the former year which were shortened to three eyes, have each of them produced two strong branches the summer past, then the uppermost of these shoots should be shortened down to three or four* good eyes, (never including the lower eye) and the lower shoots should be shortened down to two good eyes each, these being designed to produce vigorous shoots for the succeeding year, and the former are designed to bear fruit; but where the Vines are weak, and have not produced more than two or three shoots at the last season, there should be but one of them left, with three eyes for bearing; the other must be shortened down to two, or if weak, one good eye, in order to obtain strong shoots for the following summer; for there is nothing more injurious to Vines, than the leaving two much wood upon them, especially

* I leave from eight to fifteen eyes upon very vigorous shoots. Mr. Forsythe, when Grapes are cultivated for the table, recommends from fifteen to thirty eyes, from which you may have from thirty to sixty or seventy bunches of Grapes.

while they are young; or the overbearing them, which will weaken them so much, as not to be recovered again to a good state, for several years, though they should be managed with all possible skill.

In March, the ground between the Vines should be well dug, as before, observing not to injure the roots by digging too deep near them; but where there are small horizontal roots, produced on, or near the surface of the ground, they should be pruned off close to the places where they were produced; those being what the Vignerons call day roots, and are by no means necessary to be left on; and after having dug the ground, the stakes should be placed in the following manner: on each side of the Vine, should be a stake put in, at about sixteen inches from the foot, to which the two branches which were pruned to three or four eyes, each for bearing, should be fastened, (observing, as before directed, not to draw them down too horizontally) then another taller stake should be placed near the root of the Vine, to which the two shoots that were pruned down to two eyes, should be fastened, provided they are long enough for that purpose; but, if not, when their eyes begin to shoot, these must be trained upright to the stakes, to prevent their trailing on the ground, hanging over the fruit branches, or being broken by the wind.

In May, the Vines should be carefully looked over again, at which time all the weak lateral branches should be rubbed off as they are produced; and those shoots which show fruit, must be fastened with bass to the stakes to prevent their being broken, until they are extended three joints beyond the fruit, when they should be stopped; but the shoots which are designed for bearing the following season, should be trained upright to the middle stake, by which method the fruit branches will not shade those middle shoots, nor will the middle shoots shade the fruit, so that each will enjoy the benefit of the sun and air.

This method should be repeated every fortnight or three weeks, from the middle of May to the middle of July, which will always keep the shoots in their right position, whereby the leaves will not be inverted, which greatly retards the growth of the fruit; and by keeping the Vines constantly clear of horizontal shoots, the fruit will not be crowded with too many leaves, and not be too much shaded, but will constantly have the advantage of the sun and air equally, which is of great consequence; for where the fruit is covered with those dangling shoots in the spring, and is afterwards exposed to the air, either by divesting it of the leaves, or displacing the branches entirely, as is often practised, the fruit will become hard and remain at a perfect stand for three weeks, and sometimes will never

advance afterwards, as I have several times observed; therefore there cannot be too much care taken to keep it constantly in a kindly state of growth, as the Vignerons abroad well know, though it is little regarded by the generality of gardeners, who, when they suffer by this neglect, immediately complain of the climate, or the untowardness of the season, which is too often a cover for neglects of this nature. And here I cannot help taking notice of the absurd practice of those who pull off the leaves from their Vines, which are placed near the fruit, in order to let in the rays of the sun to ripen them; not considering how much they expose their fruit to the dews, which fall plentifully in autumn, and which being imbibed by the fruit, greatly retard it; besides, no fruit will ripen so well when entirely exposed to the sun, as when moderately screened with leaves, which are absolutely necessary to prepare the juices before they enter the fruit, the gross parts of which are perspired by the leaves, the fruit must either be deprived of nourishment, or else some of the gross particles will enter with the more refined parts of the juice, and thereby render the fruit worse than it otherwise would be, were the leaves permitted to remain on the branches; for if the week dangling shoots are constantly displaced as they are produced, the fruit will not be too much shaded by the leaves that are upon the bearing branches.

When the fruit is ripe, if the stalks of the bunches are cut half through a fortnight before they are gathered, it will cause the juice to be much better, because there will not be near so great a quantity of nourishment enter the fruit, whereby the watery particles will have time to evaporate, and the juice will be better digested. This is practised by some of the most curious Vignerons in the south of France, where they make excellent Wine. But after the fruit is cut, it is hung up in a dry room upon strings, so that the bunches do not touch each other, for a month before they are pressed; it will also add greatly to the strength of the Wine, because in that time a great quantity of the watery parts of the juices will evaporate. This is a constant practice with some persons who inhabit the Tyrolese, on the borders of Italy, where there is a most delicious rich Wine made, as has been attested by Doctor Burnet in his travels; and I have heard the same from several gentlemen who have travelled that road since. But with all the care that can possibly be taken, either in the culture of the Vines, or in making Wine, it will not be near so good while the Vineyard is young, as it will be after it has been planted ten or twelve years; and it will be constantly mending until it is fifty years old, as has been attested by several curious persons abroad, as also by the most skilful Wine-coopers at home, who can tell

the produce of a young Vineyard from that of an old one, after it is brought to England, by the colour of the Wine. This difference is very easily accounted for, from the different structure of the vessels of the plants; those of the young Vines being larger, and of a looser texture, easily admit a larger quantity of gross nourishment to pass through them; whereas those of the old Vines, which are more woody, are more closely constricted, and thereby the juice is better strained in passing through them, which must constantly render it much better, though the Grapes from a young Vineyard will be much larger, and afford a greater quantity of juice, so that people should not be discouraged if their Wines at first are not so good as they could wish, since afterwards, when the Vineyard is a few years older, the Wine may answer their expectation.*

The Vineyard being now arrived at a bearing state, should be treated after the following man-

* I would advise to let the Grapes hang on the Vines until they begin to shrivel, or show a disposition to drop off. Our climate being, I believe, much drier than that of Europe, and our Grapes ripening early, by leaving them on the Vines, a greater part of the watery particles will evaporate; and I am inclined to think that our Vineyards will come to perfection sooner than in that country. I am satisfied that I pulled my Grapes too soon this last season for making Wine; if I had let them hang longer on the Vine, my Wine would have had more flavour, and been richer.

J. A.

ner: first, in the pruning, there should never be too many branches left on the root, nor those too long; for although by doing this there may be a greater quantity of fruit produced, yet the juice of these will never be so good as when there is a moderate quantity, which will be better nourished, and the roots of the plants not so much weakened; which is found to be of so bad consequence to Vineyards, that when gentlemen abroad let out Vineyards to Vignerons, there is always a clause inserted in their leases to direct how many shoots shall be left on each Vine, and the number of eyes to which the branches must be shortened; because, were not the Vignerons thus tied down, they would overbear the Vines, so that in a few years they would exhaust their roots, and render them so weak as not to be recovered again in several years; and their Wine would be so bad, as to bring a disreputation on the Vineyard, to the great loss of the proprietor.*

The number of branches which the Italians generally agree to leave on strong Vines are four,

*I have found that by pruning close, I have lost my Grapes altogether; for we frequently have a very warm spell of weather in March, which causes the lower buds to swell, and then comes a sharp frost and destroys all the buds that had began to swell; on the foreign Vines I have had as many as six buds destroyed on a shoot, while the buds above produced fine Grapes. I generally, upon a strong shoot, leave from eight to fifteen buds; and where the Vines are annually manured, I do not think it injures the Vine. J. A.

two of the strongest have four eyes, and the two weaker are shortened down to two eyes each.

Constantly keep the ground clean between the Vines; dig it carefully every spring, and every third year manure it. If the land be stiff and inclinable to bind, then lay on sand or sea-coal ashes; but if it be loose and dry; a little lime mixed with dung is the best manure. Spread it thin on the surface, and in digging bury every part. It is much preferable to all dung, and where the Vineyard is large, a third part may be manured every year.

Dig and manure about the beginning of March, at which time all the superficial roots must be cut off, but the larger roots must not be injured; therefore the ground close to the stem of the vines must not be dug very deep. After this is done, place the stakes one on each side, at about sixteen inches from the stems, to which the longest bearing branches should be fastened; and one stake on each side close to the stem, to which fasten the two shorter branches upright, to furnish wood for the succeeding year.

In the summer, look them over carefully, rubbing off all weak, dangling shoots, and training the good ones to the stakes, regularly as they are produced. Stop those which have fruit in June, about three joints beyond the bunches; but the upright shoots, which are designed for bearing

the following year, must not be stopped until the middle of July, when they may be left about five feet long.*

All this summer, the dressing should be done with the thumb and finger, and not with a knife, because wounds made by instruments in summer, do not heal so soon; and the shoots being very tender whilst young, may easily be stopped by gently nipping the leading bud.

When a Vineyard is thus carefully dressed, the rows regular, the stakes exactly placed, and the upright shoots stopped at an equal height, it makes a beautiful appearance, and when the Vines are in flower, they emit a most grateful scent, especially in the morning and evening.

But as the beauty of a Vineyard depends upon the regular disposition of the Vine-branches, great care should be taken to train them regularly, and

* It will not answer to stop Vines on the bearing branches in this climate, until the last of July, or beginning of August, and those to produce fruit next year must not be stopped at all, but suffered to grow at full length. Where I have stopped them at three joints above the fruit, when the Grapes were the size of small peas, new shoots were produced, and they blossomed and bore fruit, and by stopping these last shoots in the same manner, another set of shoots appeared, and also blossomed and bore fruit. So that on the same branch, I had ripe Grapes, some nearly full grown, and others about the size of small peas at the same time. This, I think, must exhaust and injure the Vine more than by defering it to a later season. J. A.

to provide every year for bearing wood; because that which has produced fruit is commonly cut away after the fruit is gathered, or at least is shortened down to two eyes, to force out shoots for the next year; where there is not a sufficient number of branches of those trained upright, so that in summer, when the Vines are in perfection, six upright shoots should be trained for the next year's wood, and three or four bearing branches with fruit on them: more than these ought never to be left on one Vine.

The Auvernaut or true Burgundy Grape is valued in France before any other sort, because the fruit never grows very close upon the bunches, and therefore is more easily ripened; for which reason it and others like it ought to be preferred: for Grapes in close bunches are frequently ripe on one side, and green on the other, which is a bad quality for such as are to be used in making Wine.

ON MAKING WINE.

A Mr. Hamilton made a fair experiment in England, and succeeded so as to make Wine equal to the best Champaign in France. And there can be no reason why we should not make good Wines in this country, as we have a climate su-

perior to that of England, and equal to that of most parts of France.

Mr. Hamilton's Vineyard was on the south side of a gentle hill; the soil a gravelly sand. It was planted entirely with two sorts of Burgundy Grapes, the Auvernaut and the Black Cluster (the latter is with us called the Miller Burgundy or Blue English Grape.) The first year he attempted to make Wine in the usual way, but it was very harsh and austere; the second year he succeeded better in making a White Wine, which nearly resembled Champaign in flavour: in two or three years, as the Vines grew stronger, the Wine had a finer flavour than the best Champaign. He sold it to Wine merchants for fifty guineas a hogshead: and one Wine merchant to whom he sold five hundred pounds sterling worth at one time, assured him that he sold some of the best of it from seven shillings and sixpence to ten shillings and sixpence sterling per bottle, (which is equal to from $ 1 67 to $ 2 33 per bottle of our money.)

After many years experience, he let the Grapes hang on the Vines till perfectly ripe; they were then carefully cut off with scissors, and brought home in small quantities, to prevent their heating, or pressing one another; then they were picked off the stalks, and all the mouldy and green ones were thrown aside, before the Grapes were put into the press; which was done in a few hours

after they were gathered. As fast as the juice ran from the press, it was put into hogsheads and closely bunged up. These were left all Winter in a cool barn. When the fermentation was over, it was racked off into clean hogsheads, and carried to the vaults, before any warm weather could raise a second fermentation. In March, if any of the hogsheads were not quite fine, they were fined down with fish-glue.* All was bottled in the end of March. In about six weeks, the Wine would be in perfect order for drinking, and in prime order for above one year. The second year the flavour and sweetness abated, and gradually declined, till they failed entirely. Some of this was kept for sixteen years, and became very like old hock. The only art ever used was putting three pounds of White Sugar-Candy, to some of the hogsheads, when the Wine was first turned from the press, in conformity to a rage that then prevailed for very sweet Champaign.

TO MAKE WINE FROM GRAPES.

Gather your Grapes when fully ripe, pick them off the bunches, rejecting all those that are green and unsound, bruise them with a beetle or any other instrument, having a care not to bruise the seed;

*Isinglass.

for if the skin of the grape be but just cracked it is sufficient. Then put them into a cask or hogshead,* (according to the quantity,) with one head out, and cover it with a blanket and boards to keep out the dirt, &c. stir them twice or thrice in the first 24 hours, and then let them stand until the colouring matter and the pulp, if they have any, are dissolved, which will be in from 36 hours to 3 or 4 days, according to the weather, which you can see by taking up a handful and examining them: the skins and seeds will have risen to the surface, and form a solid body. Then draw off the juice from a hole made within one or two inches of the bottom of your vat, and barrel it up. But if you have not enough to fill your cask, press the skins and seeds, and put both liquors together, and leave out the bung for eight or ten days, filling it twice or three times a day for the impurities to escape at the bung; and then bung it up tight, and leave a hole for a spile near the bung, which you may draw once in two or three days for a few minutes, to let the air generated escape, and in about one month drive it in perfectly tight. If your Grapes grow on young Vines, it may be necessary for the first two or three years to add about from one to two pounds of clean moist sugar to each gallon, to give it a body and make it ferment freely.†

* Which I shall throughout this work call a vat.

† When you draw off your Wine from the vat, if it has been

Some time in the month of December following, in a clear, dry, cool day, rack it into a clean sweet cask, well scented with a brimstone match, (if it held any kind of spirit except good French brandy, the cask ought to be well scalded to take out any improper flavour,) fill your cask to within an inch of the bung, and then bung it up as tight as possible. If your Wine is not fine and bright when you rack it off, it will be best to put some fining into your cask before it is bunged tight. In the month of January or February following, examine your casks again, and if the Wine is perfectly fine, rack it again into a well scented cask, and also put a small portion of fining into it, and in the month of March it will be fit to bottle, and in six weeks afterwards it will be fit for use.

In the latter part of the month of May or June following, when the Grape Vines are in blossom, your Wine that is in casks may again go through a slight fermentation, when the bung ought to be loosened for a day or two, and then either racked off into a clean, well scented cask, or the bung

some days fermenting and comes off clear, it will be best to bung it up tight at once, having a spile hole near the bung put in lightly to prevent the cask from bursting. For I find from close fermenting, if I may so call it, the Wine is not so liable to run into the acetous fermentation, and it will be higher flavoured. But if you have to press your Grapes, it will be necessary to leave out the bung a few days, for the mucilage, vegetable extract, or leaven, as it may be called, to escape. J.A.

tightened; and if it is drawn off after this slight fermentation has ceased, and if it has got a good body, it is then nearly incorruptible; provided the cask has been seasoned with Brandy or some other sound liquor, to extract all the vegetable taste or substance out of the cask.

When the bruised Grapes in your vat have gone through a fermentation of from two to four days, the following process may be followed, taken from a book, entitled "Remarks on the Art of Making Wine," by John Maccullock:

In drawing your Wine out of the vat, it ought to be run through a hair sieve before you put it into your barrel, &c. to get rid of all the solid, insoluble, or superfluous matters, which it may contain, as those that are of use in the process have by this time performed their duties, and as their continuance would prove injurious. This removal is, in short, to be considered in the further light of the first stage of racking or decanting; an operation of which the careful performance is of prime consequence in the manufacture of Wines. For this purpose it is requisite that your vat should be tapped at such a distance from the bottom as to allow the Wine to flow clear of that sediment that may have collected at the lower end of the vessel. By this too, we are enabled to stop the transfusion of the scum which has collected on the surface, and has descended so low as to be in danger of

running out. It is peculiarly necessary to attend to the separation of the scum, as from exposure to the air, it is not only apt to acquire a musty taste, but to have become as far acid as to endanger the introduction of an acetous ferment into the Wine. It is usual in some of the Wine countries, to separate that portion of the Wine which is entangled in this solid residium, by means of the Wine press; different modes are resorted to in disposing of this Wine. Sometimes it is mixed with the Wine that has flowed naturally, and at others it is reserved for making a separate kind of Wine.

The refuse of the press is abundant in the Wine countries, and applied to the feeding of cattle, the fabrication of brandy, and other useful purposes.

The next part of the management subsequent to the fermentation, consists in the method of treating the Wine in the casks. Although the principal part of the fermentation may have been completed in the first instance before it is drawn from the vat, &c. the liquor still undergoes a fermentation in the casks, which is however much more languid and slow, and which is nevertheless necessary to its completion. If this process be suffered to go on indefinitely, in those Wines of which the saccharine principle has been entirely overcome, it will proceed to the acetous stage, and vinegar instead of Wine will be the ultimate result. Such is the natural tendency to fermenta-

tion; a perpetual progress from the vineous to the acetous; a progress which, if not counteracted by circumstances in the condition of the Wine itself, must be prevented by artificial expedients. The circumstances in the condition of the Wine, which prevent this ultimate and unwished for change, are, the disproportion between the leaven and the sugar, which suffers a part of the latter to remain unchanged after the process of vinification has been completed, or a balance of these principles so nice, that the end of the fermentation is accompanied by a perfect neutralization of the two elements which first concurred to establish it. This nice accuracy is perhaps but seldom attained, since the taste is unable to detect the least portion of sugar, which is masked by the predominant taste of the Wine, without nevertheless ceasing to produce its effect on the general flavour and quality.

Having thus established that the acetous process will not often take place, when any unchanged sugar remains, we are led to deduce useful results for practice. If, for example, the Wine is at the same time dry and light, it will evidently tend to Vinegar, unless the process be checked by the artificial means hereafter described. If, on the contrary, it is sweet and strong, we may be confident that the *acetous process cannot take place immediately*, and that it can be prevented

by carefully attending to the changes which it may undergo during the further fermentation, which it may experience in the cask. From the same principles, we can also see how the addition of sugar to Wine in the cask, the durability of which is suspected, may prevent the acetous process from taking place, *although so far from affording a remedy after it is commenced, that it may even tend to accelerate it.*

The fermentation therefore in the cask, whether it be that slow and insensible one which is to follow the fermentation in the vat, &c. or whether it be commenced in the cask itself, will be guided by the general principles already laid down. It has before been said, that the fermentation will be diminished and ultimately destroyed, by constantly separating the scum as it arises, and that it will be prolonged by returning it to the liquors. As in almost all the cases where the Wine has been tunned from the vat, it is calculated that the fermentation is nearly complete, so it will be necessary to separate the head in these cases, and that is to be done by keeping the level of the fluid so near the bung-hole, that the yeast may be suffered to escape. If, for other reasons, which must by this time be sufficiently obvious, it is to be desired to prolong the fermentation in the cask, it will be affected by the contrary practice, by suffering it to subside in the fluid, and continue the

process. This, however, being seldom necessary, we may consider the former practice as the most general guide for our operations. During this slow fermentation, the Wine undergoes any diminution, which it is necessary to remedy by the addition of fresh liquor, so as to keep it constantly near the bung-hole. The descriptions of the modes of practice followed in this part of the process in the most remarkable foreign Wines, will perhaps, form the foundation of the best rules which can be held out to the maker of domestic Wines. It will be for him to consider the particular species of Wine which he is desirous of producing, and so to manage his operations, as to tread as nearly as circumstances will allow, in the path that has been followed by the makers of Wine. In making Champaign, the Grapes are first squeezed by a gentle pressure, and poured into the vat, where they remain for one night only. The next morning, the liquor is transferred into casks. If the Wine is intended to be red, the fermentation is continued some little longer on the husks, till the red colour has been extracted; but the seeds are carefully separated, as they communicate a harsh flavour. The first fermentation in the casks is violent, and the discharge of the yeast is encouraged for ten or twelve days, by keeping them full to the bung-hole. It then becomes more moderate when the

bung is put down, and a gimblet hole fitted with a spile is made by the side of it. When the cask is thus closed, the vent hole is opened every day or two, according to the state of fermentation, for a space of eight or ten days, to allow the carbonic acid to escape. When this state is passed, fresh Wine reserved for the purpose, is poured in at the vent-hole, so as to fill the cask once a week, for the first three or four weeks, according to its waste. This operation is then performed at longer intervals, of a month or more, till the end of December, when the Wine usually becomes clear. It is afterwards decanted from the lees into a fresh cask, where it is fined with Isinglass, in the proportion of half an ounce to a pipe, and this process of decanting is carefully done in dry, clear, frosty weather; a new fermentation is now excited, by which the Wine loses a portion of its sweetness, and becomes still further ameliorated. If it should turn out too sweet, the first operation of decanting, until the fermentation in the first cask has been rendered more vigorous, which is done by stirring, or rolling the cask, and by this, the sweetness is overcome, and the Wine strengthened and improved. To ensure the fineness of this Wine, which is one of its essential properties, and to render it at the same time durable, it is at the end of six weeks, decanted a second time, into a fresh pipe, and once more

fined with half the quantity of Isinglass. It is then completed, and is put into bottles in March; clear dry weather being also chosen for this purpose. Notwithstanding all this care, a fresh deposit is still formed in the bottles, from a renewing of the fermenting process which goes on in them. To remove this, and render the Wines marketable, those of the best quality are decanted clear, into fresh bottles, in about fifteen or eighteen months, when the Wine is perfected. A certain loss, amounting to one or two in a dozen, is sustained by their explosion, previous to this last stage. The bottles ought to be well corked, and secured with a strong pack-thread, or wire and wax.

I have thought it unnecessary, to detail the many variations followed by different makers, or for different qualities of Champaign Wines; the most accurate process, being that from which the most useful lessons are to be derived. It is sometimes the case, for example, that his Wine is suffered to remain on the lees for three or four years, but this only happens when it is made in casks of a very large size.

In making the Burgandy Wines, the same practice is followed with regard to bunging and venting, great care also being taken that the Wine be decanted very clear, off the lees, as they would

otherwise re-excite the fermentation, and endanger its conversion to Vinegar.

The practice pursued in the territory round Bourdeaux, does not differ materially in the first instance, from that of Burgundy; but as it differs from it in the important operation of sulphuring, I shall describe it. It is common to fill up the cask in about eight or ten days from the time when the Wine was first introduced. The bung is lightly put down at the end of a month, and the cask is then filled every eight or ten days while it continues to waste; when this no longer happens, the bung is permanently driven. The red Wines are decanted about the end of March, or the beginning of April, but the white, in December, and they are both subjected to the process of sulphuring; of the theory and practice, I shall have occasion to speak at some length hereafter.

In making the drier sorts of Italian Wines, now scarcely known, the *must* is allowed to undergo a complete fermentation in the vat. No practices materially different from the most ordinary process, are used with regard to these, except the following. A small quantity of selected half-dried Grapes, is thrown into each large tun, when the Wine is finished. But in making the sweeter Wines, the *must* is withdrawn from the vat in five or six days, and put into the casks, from whence it is shifted rapidly, two or three times in succes-

sion, so as to retard and ultimately stop the fermentation. Thus, as must be obvious to the reader, the Wine is completed, and retains a portion of that sugar, which would otherwise be converted into spirit, and disappear. The Florence Wine is perfected by a process of this nature. For this wine, the *must* is withdrawn from the vat as soon as the head is raised. It is then transferred to the cask for thirty-six hours only, and from this cask is again decanted successively three or four times, after intervals of only a few hours, by which means the Wine is completed in a short time, so as to retain its sweetness, and become marketable. I have thought it right to detail these practices relative to the Italian Wines, as they afford most useful hints to our domestic manufacturers, to whose misplaced economy in vessels and in the labour of decanting, is owing a great proportion of their failures, and of that uncertainty which prevents them from foretelling the result of their labours, however identical, may be the receipt by which they have wrought.

It has already been seen, that the principle on which the fabrication of sweet Wines depend, is the premature stopping of the fermentation, so as to retain in the Wine a portion of unchanged sugar. This artificial term is produced by sulphuring, or, as just stated, by frequent racking, either or both of which methods are practised in

different countries. The sweetness requisite in the juice, is procured by a partial drying of the Grapes, or by the addition of boiled *must*, sugar, or honey. As the practices of different places throw no additional light on this part of the subject, I shall be excused from entering into further details of the modes practised in France, Cyprus, Germany, Spain, or the Canaries, for the manufacture of Cyprus, Tokay, Malmsey, Frontignan, Palma, Sack, or any of the well known sweet Wines of these countries, since there is no material variation in them.

It is almost equally unnecessary, to detail the practices followed with regard to the better known and more popular Wines, Sherry, Port, and Madeira, as they afford some examples relative to the use of Brandy in making Wines, it will not be superfluous, to touch slightly on the subject.

In the practice of Oporto, the complete fermentation of the *must* takes place in the vat. The Wine is then introduced into large tuns, capable of holding twenty-five pipes each, and at this stage, the Brandy is added according to the discretion of the maker. In Madeira, the second, or insensible fermentation, is carried on in pipes, and the Wine is racked from them at the end of three or four months, at which time a portion of the Brandy is added. The remainder is reserved to be mixed at the time of exportation. The

process followed in making Sherry, is rather more complicated, and appears to afford some useful hints relative to the disposal of the Brandy which fashion has introduced into the composition of this, as of the former Wines. The Grapes are first slightly dried, and sprinkled with quick lime. They are then wetted with Brandy on being introduced into the press, and a portion of Brandy is added to the *must* before the fermentation commences. By this procedure, it is probable that the Brandy is better enabled to combine with the Wine, so as to form a fluid more perfect than when it is merely, as in former cases, mixed with the Wine after that is completed. The subsequent process consists in repeated racking, at intervals of a month or two, till March; Brandy being added at each racking.

The processes of sulphuring and clarifying, on which I have slightly touched above, require to be treated more at length, as both the theory and practice of these operations, is intimately connected with the art under review.

The doctrines of fermentation, and the practices founded on them already laid down, have shown that this process has a tendency to continue under favourable circumstances, as long as the two chief agents in it, namely, sugar and leaven, remain undecomposed in the liquor. It has further been seen, that if the leaven has entirely been disposed

of during the process, by becoming insoluble in the forms of yeast and lee, and by subsequent separation, the process terminates naturally, and the Wine will, in this case, be dry or sweet, according to the proportions of sugar which may remain unconverted. It has also been proved, that if, during the process of fermentation, the sugar has been entirely overcome, while a portion of leaven remains in the liquor, the process will go on until the acetous fermentation takes place. The Wine is then destroyed, and is ultimately converted into Vinegar. I have already, in describing the racking of Wines, shown that its principal object is, to clear the liquor of its lees, which contain a portion of the yeast, and would re-excite the fermentation, if suffered to mix again with the Wine. It is thus that turbid Wine may be always considered, both as in an unfinished and a precarious state, since it is in constant danger of having the fermentation renewed, and consequently of becoming *pricked*, as the term is, or of running into the first stage of acetification. A continuation of the process which gives the *pricked* taste, converts it into Vinegar. This species of insecurity, arising from the action of the yeast, is prevented, as has already been seen, partly by working out the lighter part of the yeast, that which arises in scum through the bung-hole, and partly by the process of racking and clarifying. But neither of these

measures is capable of disengaging the Wine from the leaven, which it may hold in a state of solution, since this portion remains uniformly combined with the clear fluid. A chemical process is required for the purpose, the object of which is to render this leaven inactive, by operating certain chemical changes on it, of which the theory is perhaps, still obscure. The practice in common use for this end, is sulphuring, but I shall consider that, and some other means, adequate to produce the same effects, after I have enforced more fully what I have already laid down on the subject of clarifying. In speaking of the several particular Wines, I have stated the times which are chosen for this purpose, which vary according to the different kinds, but are rigidly adhered to by the Manufacturer of each particular sort. I have also mentioned, that dry cold weather ought to be selected for this operation, as it is then only that the Wines are clear. They are generally turbid in damp close weather, and in southerly winds; and it is evident, if they are then racked, a portion of the matter will remain adhering to the liquor. The mode in which this operation is performed, is by no means indifferent, as by the common method of tapping, it is scarcely possible to draw off the Wine without mixing a portion of the lee with it. It it more effectualy done by means of a syphon introduced at the bung. But

the most certain method, is one similar to that practised by the retailer of porter in drawing the liquor; namely, the condensation of air on its surface. This may be readily performed, without the aid of any complicated machinery. To effect it, a cock is introduced into the full cask at the usual place of tapping, three or four inches above the bottom, from which a leather-hose pipe passes into the bung-hole of the empty one. A common pair of bellows may then be so fitted to the bung-hole of the full cask, as to force, by its action, the whole of the clear liquor through the hose into the empty vessel. By this means, the least possible disturbance is created, and the Wine is at the same time, preserved from the injurious contact of atmospheric air. But the mere process of racking is insufficient to clear the Wine entirely. The complete clarification is only to be effected by precipitating the turbid matter with those substances which experience has proved to be possessed of this power. These are sand, gypsum, fishglue, gum, starch, rice, and alumen, either in the form of whites of eggs, or the scum of blood. Milk is also possessed of the same property, but in a degree less perfect. The substances most in use, are isinglass and the whites of eggs—an ounce of isinglass is sufficient for a pipe of one hundred and ten gallons of Wine, and about eighteen whites of eggs are equivalent in effect to

this quantity. Whichsoever of these substances is used, it is first diluted in a portion of the Wine, and then strongly agitated with the whole. After some days, when the Wine has become clear, it must be drawn off. The shavings of beech wood have the same effect, but it is unnecessary to multiply the account of processes after the simple ones which I have just described; and which are practically so well known.

The cases in which the process of sulphuring is required, will be apparent from the principles already laid down, and from the description I have given of the class of Wines to which it is principally applicable, those of Bourdeaux. The most simple process being equally effectual with the more complicated ones, which are sometimes followed, I shall content myself with a description of it. To perform it, matches dipped in sulphur introduced into the empty cask, where they are suffered to burn until they are extinguished by the consumption of the atmospheric air within the vessel. It is then full of sulphurous acid gas.—The Wine is afterwards introduced into it, and in a little time it is racked off in the usual way. If the fermentation should even after this be renewed, the process may be repeated as often as required. When the leaven is supposed to be so abundant, as is the case with the Wines of Bourdeaux, that this simple and slight mode of per-

forming the operation is deemed insufficient, a larger quantity of sulphurous acid may be introduced into the Wine, by pouring it more gradually into the cask and repeating the combustion of the match at several intervals during the process of filling it.

The theory of this process appears to consist in a change produced on the soluble ferment or *leaven*, analogous to that by which it is converted during the act of fermentation, into insoluble ferment or yeast. The Wine becomes turbid, apparently from the precipitation of the yeast, and, unless it is fined and racked, is still ready to undergo a renewed fermentation. *But when cleared of this matter by the above mentioned process, it remains unalterable.* It is evident that the same process applied to highly saccharine Wines will tend to preserve their sweetness; and thus, indeed, most of the sweet Wines are prepared. It will be easily understood from the processes thus generally described, how far the maker of domestic Wines is capable of deriving advantage from them. The rules are, in fact so universal, that it would be a waste of time to enter into more details respecting their application. But, before I quit this subject, it will not be uninteresting to point out some methods of attaining the same end, which are little known, and perhaps more convenient, than the processes above described. One of

these is the introduction of the Black Oxide of Manganese, whose properties in precipitating the *leaven*, are similar to those of sulphuric acid. But a more ready, and perhaps the most convenient process of all, is the use of sulphate of potash, a salt easily prepared, or easily procured from the trading Chemists. A very small quantity of this salt, which possesses the advantages of durability, is sufficient to answer the purpose. A drachm, for example, will be enough for a pipe of Wine. *It communicates no taste, and can readily be managed with the greatest accuracy, by proportioning the quantity to the particular circumstances of the Wine.* Makers of sweet-meats will not be displeased to know, that by the use of the same substance, the fermentation of syrups and preserves may also be effectually prevented.

Two general matters yet remain to be spoken of, which regard the practice of Wine-making—These are the medication of Wines, if it may be so called, including those practices by which Wines may be mixed, corrected, and altered, and the means of remedying those diseases to which they are liable.

The medication of Wines consists in altering the colour, the flavour, or the strength of any given Wine, or in so mixing two or more together, as to produce a compound, differing from, or superior to, either of them taken separately.

It is difficult to give any rules for the mixing of Wines. as the taste and experience of the maker are the only guides to be depended on. Yet this is an important branch of the art of Wine making, in Wine countries, and it is no less applicable to the production of useful results in our domestic manufacture. It is evident that a weak Wine and a strong one, a harsh and a sweet, a flat and a brisk Wine, may be materially benefited, by mixture, and that the produce may be superior to either of the Wines taken separately. By the same means, also, colour and flavour may be interchanged, or communicated; but taste, smell, and practice, are the guides in this operation. It generally happens, that when two distinct Wines are mixed, the process of fermentation is partially renewed, or the mixture, in technical language, *frets*. This observation applies to a valuable practice in this manipulation, namely, fretting in, technically so called. It is found, by experience, that mixed Wines unite into one durable and homogeneous liquor, only in consequence of this fermentation. A season and circumstances are therefore chosen in which, one or both of the Wines to be thus mixed, are either in a state of renewed fermentation, or show a tendency to it. The Wines being then proportioned according to the fancy, or the experience of the artist, a strong fermentation is excited, which is still further assisted by agitation.

When this process, which is conducted with the precautions formerly laid down for the treatment of close fermentation, is completed, the Wine has become uniform, and is converted into a homogeneous liquor, with no further tendency to change than if it had originally been produced by one operation. A repetition of the processes of fining and racking, suffice to perfect it, by disengaging such superfluous leaven, lee, or colour, as would spoil its appearance, or endanger its durability. In the Wine countries, particular Wines are manufactured for the sole purpose of mixing with others; these are distinguished by their strength, their harshness, colour, or flavour, and are applied according to the exigencies of the case. Peculiar kinds of Grapes are cultivated, and peculiar management, into which I need not enter, resorted to, for making those Wines.

The few properties which require correction, are chiefly contained under the following heads.

The fault of excessive sweetness arises either from too large a portion of sugar, compared with the leaven, or from the imperfect fermentation which the fluid has undergone. It is prevented, if it arises from the first cause, by reducing the quantity of sugar, or increasing the proportions of leaven and tartar, by the means which have already been amply pointed out. If it proceeds from the latter cause, it may be remedied by pro-

longing the fermentation, of which the means have also been fully detailed in other parts of this essay.

Another fault to which Wine is subject, is an excessive sharpness. Too active a fermentation in a fluid containing much of the vegetable acids, will, by destroying the whole of the sugar, lead to this fault; a fault in almost every Wine, except those of the Hock and Rhine growths, in which it constitutes a valuable feature, from circumstances yet unexplained, and in which it is almost always accompanied with uncommon durability: it is an accident to be expected, when unripe fruit has been used, unless that has been counteracted by corresponding increase of the saccharine principle.

Yet it is a fault, which should be pointed out, sensible as it is to those who know the value of that undefinable light, and quick flavour, so perceptible in the good Wines of France, and which so completely disappears under the treatment by which the stronger Wines of Spain and Portugal, are made marketable in England.

It is a quality, which sometimes arises from age, sometimes from the complete annihilation of the fermenting process, whether this has been the consequence of natural causes, or of too sedulous a pursuit of the artificial means of stopping it; but the common cause of this evil, is the admix-

ture of Brandy, or Spirits. This practice is universal in the Wines of Spain, Portugal, and Sicily, which is intended for exportation. It has also been introduced into the Wines of other countries, under the mistaken notion of preventing them from turning sour, and with the idea, that it enabled them to keep for a longer time. As this is a question of some importance, both as it regards the perfection, and the economy of our manufacture, I shall enter somewhat largely into it.

It had long been thought, from the vain attempts of Chemists, to separate the Alcohol which is a constituent part of Wine, by other chemical processes than distillation; that this substance existed in it, either in a far different condition from that in which we know it, when in its separate state, or that the intoxicating substance contained in the Wine, was not Alcohol. This opinion appears to have originated with Rouelle, who imagined that Alcohol was not completely formed until the temperature was raised to the point of distillation. More lately the same doctrine was revived, and promulgated by Fabroni, in the memoir of the Florentine Academy. His opinion was founded on the following experiment: when Alcohol is added to new Wine, he observed that he could by the introduction of the sub-carbonate of potash, in sufficient quantity, separate

the added Alcohol, while the spirit of the Wine remained attached to it as before these additions, and could only be obtained by subjecting it to distillation. Hence, he concluded, that the Alcohol was formed by the action of heat on the elements of Wine, or that it was a product of distillation.

But the experiment was not attended with similar results in the hands of other Chemists, unless in cases where the added Alcohol bore a very considerable proportion to the Wine, and it consequently left the question respecting the formation of Alcohol in Wine, in the same state as before. I need not point out the laxity so apparent in Fabroni's reasonings, as it would lead to discussions too minute for this essay. But the attention of other Chemists, has been excited towards the same object, and conclusions, the reverse of his, have been the consequence. If sub-acetate of lead be added to Wine, and the clear liquor be then saturated with sub-carbonate of potash, the Alcohol will be separated. It also appears, from the experiments of Gay Lussac, that Alcohol can be separated from Wine by distillation, at the temperature of sixty-six degrees, and indeed, from the trials of Fabroni himself, this separation was produced at sixty-three degrees. More recently, by the aid of a vacuum, the distillation has been effected at fifty-six degrees; a proof that

Alcohol is not produced by the action of the heat required for boiling Wine, or wash, on the elements which these substances contain. It must therefore be considered as one of the elementary constituents of Wine; and whatsoever phenomena it may therefore present with re-agents, or a subject of chemical enquiry, must, as far as they may differ in different Wines, arise from differences in its mode of combination with one or more of the other ingredients which enter into that compound fluid. Although, therefore, Alcohol is ascertained to exist ready formed in all Wines, so much of the experiment of Fabroni, is still true as to be an object of utility in the subject we are now examining; while the conclusions to be drawn from it appear of importance in explaining the different effects of simple Wines, and Wines in which Brandy has been mixed. It is presuming much too far on our Chemical knowledge, to imagine that we are acquainted with the nature of Alcohol. It is possibly to varieties of composition, analogous to those which are found in the very variable substances included under carbureted hydrogen gas, and which, although they have not been appreciated by Chemical actions, merely perhaps, because the subject has been supposed to be already understood, and the substance itself imagined in all cases to be Chemically identical, may be ascertained hereafter, by more refined

experiments, in the hands of acuter Chemists, to whom this subject is here pointed out, as calling for investigation. It is otherwise impossible to understand the differences which appear in its effects on the nervous system, when taken into the stomach under its different forms. Where its specific gravity, and consequently its imagined condition is in different specimens, absolutely equal, yet these specimens, produced under different circumstances, operate on the nervous system in a manner so totally different, as to point out some radical differences of which specific gravity is no criterion. The comparative effects of new and old Rum, of equal *proof*, of Dutch Gin, and of diluted Alcohol, of equal strength, are too well known, to require more than a bare mention. It has been supposed, for want of better means of explaining these effects, that they were due to the essential oil contained in the different varieties of Spirits used as a beverage. But of these we know nothing. We are sure that they are very trifling in quantity, since they cannot be separated by water, except in the single case of Gin, where a foreign oil is purposely introduced. Neither are we acquainted with any oils of this class, whose qualities are deleterious, except that of the bitter kernels, their analogous kindred to laurel, and a few other bitter vegetables, whose poisonous qualities besides, appear to be subject to no

modification, being, where not deadly, almost unproductive of any effects. Moreover that spirit, Alcohol, from which, by careful rectification, the essential oil seems to have been most carefully removed, is more injurious than those which, like Rum and Brandy, are known to contain it.

Dilution does not remove the injurious effects of these noxious spirits. When Spirit of any sort is mixed with water, it requires some little time to effect the union of the two substances; they ultimately become combined. Yet the effect of one kind of spirit, although combined with water, is still different from that of the other on the human body. They are both very different from that of pure Wine, in which chemical reagents or distillation have ascertained precisely the same proportion of Alcohol. In other words, the same quantity of Alcohol applied to the stomach under the form of Wine, and in a state of mere combination with water, is productive of effects on the body, not only immediately, but ultimately attended with considerable differences. These are well known to physicians. They are equally well known to those whose habits of observation, either on themselves or others, have led them to compare the moral effects, if we may so term them, produced by intoxication with different Wines, with Champaign and Claret, or with Port or Sherry; the elevation of thought produced by the former,

with the sedative effects of the latter; or who have had an opportunity of witnessing the stupidity produced by ale, and the ferocity which results from intoxication with spirits. The nervous system is here a test of differences which elude the ordinary resources of chemistry. Yet the reagents which have been applied to the investigation of these differences, although they have done little, still show that some chemical distinctions may really exist. It has been perhaps hastily said of Fabbrioni's experiment, that it was useless, since it produced no consistent result. On the contrary, it appears to be a test applicable to some of the least tenacious combinations of Alcohol, and the censure unjustly passed on it, has originated in want of attention to the subject, and to those delicate circumstances in the combinations of Alcohol, on which its various effects, as it exists in Wine and other potable liquors, depend. Could we discover an additional number of reagents differing from their various powers of separating the different combinations under which it is found, I have little doubt that chemical means would shortly illustrate, by corresponding differences of effect, the different powers which these beverages exert on the nervous system. The experiment of Fabbrioni is perfectly valid to a certain extent, and the causes of the supposed irregular results, appear

to be abundantly obvious. If Alcohol be mixed with water in any proportion, it may be separated by carbonate of potash. If it be mixed with Wine in the same manner, it is, with due attention and in particular circumstances, equally separable. But if an attempt be made to separate the adventitious Alcohol from these Wines, to which it has been added by the manufacturer, the experiment will sometimes succeed and sometimes fail. The cause is mentioned in various parts of this essay, and is apparently this: If the Alcohol or Brandy be added before the fermentation of the Wine, or at some subsequent stage when that fermentation can be artificially re-excited, it then enters either entirely or partially into a more perfect combination with the Wine than that which it forms after a mere admixture; or a portion of it at least, proportioned to the degree of fermentation which takes place after its addition, becomes thus combined. Here the test indicated by Fabbrioni fails, although reagents of higher powers are still capable of effecting the separation. In all such cases the Wine is imperfectly vineous, the Brandy being almost alway sensible to delicate palates, and its effects on the stomach are proportionably injurious. The test is therefore of real use in ascertaining the correct fabrication of those Wines to which Brandy is added, and it will invariably be

found that the worst Wines of the growth of Portugal and Spain are those which are the most sensible to it; or in other words, those which contain the greatest quantity of uncombined Alcohol. But, to return to the consequences which arise in the liquor itself from the admixture of Alcohol—*It decomposes the Wine.* However slow the decomposition may appear, they are not the less certain. The first and most conspicuous effect, is the loss of that undefinable, lively or brisk flavour, which all those who possess accuracy of taste can discover in French Wines, or in natural Wines; and a flatness, which must be sensible by the principle of contrast to the dullest palate which shall compare the taste of Claret with that of Port, or that of Hock or Grave, with that of Lisbon or Bucellos. It tends equally, although in a greater length of time, to destroy the union of the colouring principle, which is well known to be deposited in Port Wines, and apparently in a great measure from the action of this foreign substance. It may not be useless at the same time, to consider the influence which it must have on the quality of the Wine as a beverage. The habitual use of Wine containing, as many of the Wines of Portugal so often do, a large portion of Brandy, must be manifestly equivalent to the habitual use of Spirits and Wine together. To this cause we may doubtless attribute the great

difference in the effects produced by an immoderate indulgence in Port and Sherry, or by a similar use of Claret and other French Wines. Even the immediate effects are sensibly different, as I have said before, and the transitory nature of the one, with the permanence of the other, are too well known to be insisted on. But the ultimate consequences appear to be of a more serious nature. It is well known to physicians that diseases of the liver are the most common and the most formidable of those produced by the use of Spirits. It is equally certain that no such disorders follow the temperate use of pure Wine, however long indulged in; and to this cause, the concealed and unwiting consumption of Spirit, as it is contained in the Wines commonly drank in this country, is doubtless, to be attributed the excessive and increasing prevalence of hepatic affections, diseases comparatively little known on the continent of Europe. It is sufficient to have touched on this most important subject, on which the proposed limits of the present essay will not allow me to dwell. It is more to my present purpose to show, that the use of Brandy in the manufacture of Wine is founded on a mistaken principle. Having shown that it is injurious to Wine in general, by destroying its liveliness, and hastening its decomposition, I might strengthen this assertion by mentioning

that it is not used in any of the Wines of *France or Germany*, and that the finer Wines, Claret, Burgundy, and Hock, are totally destroyed by it. But it is also proper to point out its insufficiency for producing the effects expected from it, the preservation of the Wine, and the retardation of the acetous process. The reader is here reminded that the acetous process cannot take place while there exists between the leaven and the sugar a disproportion in favour of the latter, and that the fermentation cannot be re-excited if the leaven has been entirely separated by the usual process of racking, fining, and sulphuring, should even the sugar have disappeared. Such Wines can have no tendency to vinegar, and the addition of Brandy, if intended to prevent that effect, is at least superfluous. It is now to be enquired whether Brandy has any power to prevent the acetous process from taking place, supposing that the circumstances favourable to it are present. If Brandy in small quantity be introduced into vinegar during the acetous stage of fermentation, the process goes on as before, and the Alcohol is acetified, the produce becoming a stronger vinegar. This has been lately denied by Mr. Cadet, in whose hands the addition of Alcohol in small quantities appears to have had no effect on the acetous process. From his experiments it would also ap-

pear, that the addition of Alcohol in a quantity exceeding one seventeenth of the fluid, suspends the acetification. In the state of ignorance in which we are respecting the chemical nature of that process, it does not appear easy to reconcile these contradictory experiments. Admitting that the experiments of Mr. Cadet are unexceptionable, it remains certain that Wine can be, and daily is, brought into the acetous fermentation by proper treatment, or under natural circumstances, although containing a far greater proportion of Alcohol, than that which appeared to him sufficient to suspend the process. It is certainly possible, that the state of combination above described, in which the Alcohol exists in the Wine, may, when contrasted by the mere mixture which may possibly take place in his experiment, account for this difference of effect; or it may even happen that the action of Alcohol on a process already commenced, may be sufficient to account for the difference; the same Alcohol applied before the commencement of the process being susceptible of the incipient changes, and being thus ultimately capable of entering into the final ones in common with the rest of the fluid. But this subject is very obscure.

I must therefore proceed in the examination of this subject, on the basis of former experience, omitting any exceptions to be drawn from these

experiments, as being for the present incapable of application; the more so, that they do not appear strictly applicable to the case under review, the prevention of the change of Wine to Vinegar. If Brandy and Milk are mixed together, the acetous process establishes itself speedily, and the produce is Vinegar. We have here an ample proof that Brandy, in these cases, so far from checking the acetous process, increases it; and therefore, that its use, as a preservative of Wine, is founded in error. I have dwelt the more on this subject, because this view is opposed to all popular opinions and practices, opinions most assuredly founded on erroneous and vague analogies, drawn from some supposed preservative power, residing in spirits. I am the more particular in calling to this subject, the attention of those who may engage in the manufacture of Wines, because a notion is prevalent, that Wines cannot exist without this ad-mixture. The effect on the contrary, is to destroy the briskness of Wines, while it increases the expense and diminishes their salubrity. If taste or prejudice require that Wine should be stronger than it can be made naturally, or if, for temporary purposes, it is desirable to mix Brandy with Wine, it may be done, but under certain restrictions which I shall presently point out, when I have occasion to speak of the diseases incident to Wine, and their remedies.

The last remarkable quality in Wine, which may err in excess or defect, is its briskness. The cause of briskness, which is in general a desirable quality, has already been shewn to consist in a forcible restraint of the carbonic acid by the pressure of the cork, care being taken to bottle the Wine before the fermentation has entirely ceased. The mode of managing this, has been fully pointed out when describing the process used in Champaign. Yet I may add, *that briskness in Wine will always be better ensured, if a portion of the fruit used be in an unripe state.* The period of bottling, has a considerable effect on this property. That which is bottled in the month of March, immediately following the Autumn in which it was made, possesses it in the greatest degree. If delayed till August, it will still mantle, but when bottled either in the intermediate Summer months, or in the cold of Winter, it is subject to lose this tendency. It may be prevented by racking and sulphuring, since it is obvious that whatever destroys the power of fermenting, must also destroy this propensity to froth.

I have often said, and it is almost superfluous to repeat it, that Wines made from fluids whose composition we can command, may be produced of any degree of strength, merely by a due proportion of sugar, and a proper management of the fermentation. I have also pointed out the bad consequences which follow the admixture of Bran-

dy or Spirits with Wine. Yet it is difficult to overcome established practices; I think it right to describe the mode in which Brandy may be added to Wines with the least possible injury, when it is desired to render them stronger—I have fully shewn, that this is, in fact, the only effect which Spirits are capable of producing. If Brandy be added to any Wine after it is completed, it merely produces a mixture, in which Brandy is not only generally to be distinguished by an accurate palate, but in which all the evil effects I before pointed out, are most conspicuous. To render this mixture more complete and less injurious, it should be made while the process of fermentation is still going on. The most convenient time will be, during the insensible fermentation, which takes place in the cask. By this method, a portion at least of the added Spirit, enters into permanent combination with the Wine, in consequence of its having undergone the action of the fermenting process; and the injury to the quality of the Wine is the least possible. If the wish to add Brandy should not have risen until after the Wine is completed, it should then be managed in the way already recommended for mixing different Wines; namely, by the process technically called *fretting-in*. That the time of the year should be chosen when Wine is inclined to *fret* or to renew its fermentation, which process can be aided by stirring up the lees

by heat or by rolling. The Brandy being then added, a more intimate union of the two is produced, than could have been procured in the common way. I may add, that this practice is well known to Wine-coopers.

The last of the minor objects, connected with the art of Wine-making, are the remedies applicable to this fluid, under the various diseased alterations of which it is susceptible.

Sweet Wines and strong, are so little liable to morbid changes, that the few rules I have to give respecting them, may never be wanted. Yet as they will serve to complete these general views of the subject, and to render the manufacturer more completely master of his art, I shall mention the little which is known on this head. The delicate and thin Wines are those most subject to change. In these, the renewal of the fermentation is always to be feared under change of place and temperature; leads, as I have already shewn, to the acetous process, and thus to the destruction of the Wine. This process once begun, is difficultly checked; it may be suspended or concealed, but the Wine is still irreparably injured. It can only be prevented by diligent and careful application of the processes of sulphuring, fining, racking, already so fully described. Among these, let the Wine-maker always bear in mind, that fineness in Wine, is not merely a quality intended to please

the eye, but that it is essential to the durability of the liquor. I have already pointed out as necessary to the prevention of ascecents in Wine, that some saccharine matter should remain in it undecomposed. In this case, it cannot easily run into the acetous state. The addition of a small quantity of sugar to the Wine, of which the durability is suspected, either in the cask or in bottling, operates on this principle in preserving it. This practice is common in the poorer Wines of Champaign, and it is found to be effectual. The sugared Wines of Champaign are distinguishable by good judges; *not, however, simply because they are sugared, but because this addition is only made to the Wines of inferior quality.* Boiled *must* is used in many Wine countries; in Spain, Italy, and Greece, for example, with the same views. The degrees of ascecency is most common in weak Wines, in which the tendency to Vinegar is always great, although the Vinegar which they yield is necessarily weak. It is also common to those which contain much extractive matter, and which, under other circumstances, are apt to turn ropy. *On the contrary principle, it is impossible to convert into Vinegar, those Wines from which the whole of the extractive matter has, by age, or other causes, been precipitated.* It is further proper to remark, that the contact of atmospheric air is necessary to acetification, and that is consequently to be re-

vented by an absolute exclusion of this substance, such as may be effected in bottles perfectly full, and properly sealed. Change, and increase of temperature, are also favourable to this morbid process, and for these, the obvious remedy is the uniform low temperature of a good cellar. A consideration of these circumstances, will teach us how the disease may be prevented. It is another matter to know how it is to be corrected, when it has taken place.

By means of sweets, the acid taste, if not in excess, may be palliated. But it can only be removed by such substances as neutralize and destroy it. For this purpose, the alkalies and the alkaline earths have been used. As the alkalies form soluble salts with Vinegar, they are apt to communicate a disagreeable saline taste, which may be avoided by substituting chalk or lime, of which the produce is nearly insoluble, and may be separated by fining. It is well known, that lead in different forms, has frequently been employed for this purpose; but the practice being attended with dangerous consequences, is now obsolete. It is proper, however, to know that there are three substances to which Wine may be indebted for excessive acidity; the tartarous, malic, and acetic acids. Of these, the two first form compounds with the acetic acid, which are nearly insoluble, and which may consequently be separated by fin-

ing. The acetate of lead alone is soluble, and in small quantities may be taken without inconvenience. It is probable, however, that the substance formed by immersing metallic lead in Wine which contains Vinegar, is either the subacetate or ceruss, the latter being a substance productive of well-known diseases, but from its weight, incapable of being permanently suspended in the Wine. In attempting to diminish the apprehensions that have been entertained on this point, I am far from recommending this remedy, since it is less efficacious than time, and cannot be considered free from danger.

Ropiness is the next disease to which thin Wines are particularly liable: It occurs in those which contain a good deal of extractive matter, and appears to result from the action of oxygen on the soluble extract, converting it into an insoluble one, somewhat analogous to fibrine. The *mother*, as it is called, of Vinegar, seems to originate from similar causes. This disease may be cured, by exposing the bottles in which it has taken place, to the sun and air, by agitating and subsequently uncorking them, by a small quantity of vegetable acid, and by fining.

The last disease of Wine, is a taste of mustiness derived from the cask or cork, a disease to be prevented by proper precautions in the selections of the vessels, but scarcely to be cured.

I have now finished all that I proposed to say on the general principles of Wine-making, without a knowledge of which, every attempt to ameliorate, or even correctly to practice that branch of the art, which alone, is practicable in our country, would be vain.

As there are thousands of bushels of Grapes growing wild over the whole face of our country, particularly to the southward, I shall make no apology for giving the following extract from M'Cullock, on Wine making.

" It is the object of this essay, to show that the making of good Wine from Grapes of British growth, does by no means depend on their maturation, and that this is not a necessary circumstance. The process of making Wine from Grapes will be reduced to a much narrower question, if we can succeed in making it at all times, unchecked by seasons or accidents. A Vineyard may be conducted with almost as little care as a gooseberry, or currant garden, with the certainty of a constant produce, applicable to the purposes in view; and it will be in every one's power in almost any situation. However precarious the ripening of the Grape may be, its produce is not so. We are sure of an annual crop of Grapes, but not of an annual crop of ripe ones."

A compound and artificial *must*, can be fabricated from due mixtures of sugar, with the ex-

tractive matter and saline substances of fruits, capable of undergoing a regular fermentation, and of forming good and perfect Wine. The case is as applicable to the Grapes, as to the gooseberry, or currant. Long ago, experiments were made in France, by several Chemists, with green Grapes and sugar, and with complete success. I have repeated these experiments, and varied them with the best effects. The produce has varied with the management, and the results of the trials have been Wines resembling Champaign, Grave, Rhenish, and Moselle, and of qualities so perfect that the best judges and Wine tasters have not been able to distinguish them from foreign Wines. The Grapes may be used in any state, however immature. When even half grown and perfectly hard, they succeed completely. It is evident that Wines made on this principle, will be more expensive than when made from ripe Grapes, as a sufficient quantity of sugar must be used to compensate for the deficiency of the natural sugar of the Grape. But even then, they are not more costly than currant and gooseberry Wines, while at the same time, their superiority is beyond all comparison. The hardest Grapes will produce a Wine of the strength of White Hermitage, with a proportion of three pounds of sugar to the gallon; and the expense

will be trifling, compared to the value of the produce.

It might be supposed, that these Wines would necessarily be devoid of flavour. But this is by no means the case, since all the specimens which were under my direction, were characterised by flavour as genuine and decided as those of the foreign Wines to which they approximated. I have little doubt, under due management, on a large scale, and with sufficient age, Wines of the Hock quality could be equally well produced here in the same way.

Many trials must yet be made before we can hope to appreciate the extent of our resources in this manufacture. It is more than probable, that different Grapes, even in their immature state, would produce different Wines; but these trials must be left to the efforts of individuals, and to the necessarily slow progress of experiment.

With regard to the management, it must be founded on the operations followed in the Wine countries, and of which a sufficiently full account for all purposes of practice, has already been given. It is, in the first place, obvious, that the Grapes should be suffered to remain on the Vines while there is any hope of gaining an accession either of strength or sweetness. They should then be carefully separated from the stems; those which are rotten, or mouldy, should be at the

same time rejected. Some judgment will be required in proportioning the fruit to the water in the first instance, and to the sugar in the second. I have before said, that the Grape when ripe, consists of sugar, combined with vegetable extractive matter, or the fermenting principle, and certain salts, besides the astringent and flavouring matter. As the colour is not developed in the immature Grape, it need not be noticed here. But the proportions of these ingredients vary materially, according to the state of maturity of the fruit. As a great part of the saline and other constituents of the Grape, appear to be converted into sugar during the process of maturation, it is plain that, weight for weight, there will be more of these principles contained in the immature, than in the mature fruit. To form therefore a *must*, of such quality as shall resemble the natural *must* of ripe fruit, it is necessary that water should be added to the immature juice for the purposes of diluting, and thus diminishing the proportions of those saline matters, which would otherwise confer on the Wine a degree of harshness, difficult to overcome.

As it is impossible to give positive rules to meet the infinitely varying and undefinable degrees of maturity, in which the Grape may be used, and as such rules would in fact but tend to mislead, I shall content myself in laying down

some general principles, leaving the application to the ingenuity and observation of the operator.

If the object be to produce Wine which shall resemble Champaign, or the White Wines of Bordeaux, a small proportion of crude Grapes will be required. Grapes barely half grown, require, for the production of Wines of this class, to be used in the proportion of equality to water. If they are more grown, the proportion of Grapes may be increased ; if less, it may be diminished. If the intention is to make a Wine resembling Hock, the proportion of Grapes must be materially increased, and the Wine then, harsh, austere, and not drinkable, when new, will by a few years residence in the cask, undergo that amelioration, which time alone can give. To the proportions which I have described, varying quantities of sugar may be applied. A proportion of two pounds to the gallon of mixture, will yield a very light Wine of no great durability, resembling (under the proper treatment) the inferior classes of Champaign Wines. An increase of the sugar to three pounds, will yield a Wine equal in strength to the best sorts of Champaign, or if fermented to dryness, to the strongest of the White Wines of Bordeaux. Larger doses of sugar will doubtless yield Wines of different qualities, but of such proportions, I cannot speak from experience. I may only caution the operator who shall under-

take these trials, that larger quantities of sugar, require larger proportions of fruit; if it be his intention to work the Wine to dryness, as the quantity of fruit above mentioned, is but barely sufficient to convert the proportion of three pounds above named. With regard to the durability of these Wines, I may add, that I have kept them for seven years, and all that time with evident improvement. I should consider them as little liable to destruction, as Wine of the very best *fabrique*. While on the subject of sugar, I may also say, that the general cause of failure in those Wines which are made in this country, from ripe Grapes, is the deficiency of sugar, and that even these, would be much improved by an addition of it. It is owing to this deficiency, that these Wines are perishable, and easily converted into Vinegar, the natural *must* being too aqueous to produce a durable Wine. The proportion of sugar need not be large in these cases, as before remarked; but no positive rules can be given for it, since it must vary with the maturity and saccharine quality of the fruit; circumstances which differ in almost every season.

Two modes of management may be adopted with regard to the fruit, either subjecting the skins to fermentation or not. In the first case, a greater degree of austerity will be the consequence, and the Wine will vary in its qualities.

duce of a small Vineyard in leaves alone will be abundant, and even that of a single Vine will be as great as is required for the use of most families, should they make this Wine for their sole consumption. *Let it always be remembered, that in all these cases the price of the Sugar is the price of the Wine.* The expense of utensils and labour is comparatively trifling, and when the manufacture is on a small scale, scarcely worthy of regard.

I have thus brought to a conclusion the remarks which I purposed to make on the Art of Wine-Making. That I have offered so little from my own experience, will be pardoned by those who consider that each experiment must extend to a period of one or two years, and that the labour of a life would be insufficient to reduce every one of these suggestions to practice. It will be enough that they are all readily deducible from others, or from fair analogies taken from established rules of practice, in the Wine countries. The co-operation of many, to which I may hope this essay will afford additional facilities, will in time improve this practice to the degree of perfection of which it is capable, and establish it on a sure and solid basis.

As numbers who may wish to make Wine, will not be at the trouble of going through the preceding essay; and if they did, perhaps would be unable to follow all the principles laid down, I have

thought it best to add the following receipts, to bring the whole into a more compact view; but still there must be much left to the attention and skill of the operator.

TO MAKE WINE FROM IMMATURE GRAPES.

Although they will make Wine in any stage of their growth, I would advise them to be left on the Vines until they have attained their full growth.

The following Receipts are for ten gallons of Wine, which may be increased to any quantity by taking the fruit, &c. in proportion.

To a tub of the capacity of fifteen or twenty gallons, take forty pounds of immature Grapes, (no matter for the variety, or whether wild or cultivated,) and bruise them in successive portions, by a pressure sufficient to burst the berries without breaking the seeds; and as there is no bad flavour in the green skins or stems, it is not necessary to separate them. Four gallons of water are then to be poured into the vessel, and the contents are to be carefully stirred and squeezed in the hand until the whole of the juice and pulp are separated from the solid matters. The materials are then to remain at rest from six to twenty-four hours, when they are to be strained through a coarse bag, by as much force as can be conveniently applied to them. One gallon of fresh water may after-

wards be passed through the *mare*, for the purpose of removing any soluble matter which may have remained behind. Thirty pounds of white sugar are now to be dissolved in the juice thus procured, and the total bulk of the fluid made up with water, to the amount of ten gallons and a half. The liquor thus obtained is the artificial *must*, which is equivalent to the juice of the ripe Grape. It is now to be introduced into a tub of sufficient capacity, over which a blanket or similar texture, covered by a board, is to be thrown, the vessel being placed in a temperature varying from 55 degrees to 60 degrees of Farenheit's thermometer. Here it may remain for twenty-four hours or two days, according to the symptoms of fermentation which it may show, and from this tub it is to be drawn off into the cask in which it is to ferment; when in the cask it must be filled nearly to the bung-hole, that the scum which arises may be thrown out. As the fermentation proceeds, and the bulk of the liquor in the cask diminishes, the superfluous portion of *must*, which was made for this express purpose, must be poured in, so as to keep the liquor near the bung-hole. When the fermentation becomes a little more languid, as may be known by a diminution of the hissing noise, the bung is to be driven in, and a hole bored by its side, into which a wooden peg is to be fitted. After a few days this peg is to be loosened, that if any material

quantity of air has been generated it may have vent. The same trial must be made after successive intervals, and when there appears no longer any danger of excessive expansion, the spile may be permanently tightened.

The Wine thus made must remain over winter in a cool cellar, as it is no longer necessary to provoke the fermenting process. If the operator is not inclined to bestow any further labour or expense on it, it may be examined in some clear and cold day towards the end of February or beginning of March, when, if it is fine, as it sometimes will be, it may be bottled without further precautions.

To ensure its fineness, however, it is a better practice to rack it into a fresh cask towards the end of December, so as to clear it of its first lees. At this time also the operator will be able to determine whether it is not too sweet for his views. In this case, instead of racking it, he will stir up the lees so as to renew the fermenting process, taking care also to increase the temperature at the same time. At whatever time the Wine has been racked off, it is to be fined with isinglass. Sometimes it is found expedient to decant or rack it a second time into a fresh cask, and again to repeat the operation of fining. All these removals should be made in clear, dry, and if possible, cold weather; in any case it must be bottled during the month of March.

The Wine thus produced will generally be brisk, and similar in its qualities to the Wines of Champaign, with the strength of the best Sillery.

Inattention, or circumstances which cannot always be controlled, will sometimes cause it to be sweet, and still at others to be dry.

Variations of the Process described above.

The skin of the Grape or the whole *mare*, as well as the juice, may be fermented in the vat, along with the sugar in the first stage of the process. The fermentation will thus be more rapid, and the Wine prove stronger and less sweet, but it will acquire more flavour.

If it is wished to have a very sweet, as well as brisk Wine, the quantity of sugar may be increased.

If the Wine is intended to be less sweet, and less strong than in the first case, the sugar must be reduced to twenty-five pounds. Thus made, it will rarely fail to be brisk, but will, at the same time, be less durable. Wines of this construction will resemble the inferior classes of Champaign, and must commonly be consumed within the twelvemonth.

The proportion of fruit adapted in this receipt, is that in common use, but to ensure briskness without excessive sweetness, it is recommended to increase the proportion of fruit to fifty

pounds, when the sugar is thirty. If, during the fermentation of Wine thus formed, there should appear any danger of the sweetness vanishing altogether, it may be decanted, and the fermentation then checked by fining. Thus it will be speedily fit for use.

Wine from immature or ripe Currants, may be made in the same manner as above, and with the same proportions of sugar, &c.

TO MAKE WINE FROM RIPE GRAPES.

If Wine is made from ripe Grapes, no water is to be used, but while the Vines are young, the juice of the fruit is generally deficient in sugar; it is necessary that a quantity of sugar, varying from one to two pounds for each gallon of *must*, should be added to it, and this in proportion to the greater or less sweetness of the fruit.

When your Grapes are perfectly ripe, have them gathered and picked off the bunches, rejecting all the unripe and unsound ones; then bruise them with a light beetle, or in any other way without breaking the seeds. (If the skin is broke, it is sufficient:) then if your quantity be sufficient, put them into an hogshead with one head out, which I shall call a vat, and after stirring them

twice or thrice, the first 24 or 36 hours, according to the temperature of the weather: then let them stand after the last stirring, from two to six days, to dissolve the colouring matter in the skin and the pulp, if they have any. The skins and seeds will rise to the top of the liquid in the vat, and by examining them once or twice a day, it is very easy to discover when the dissoluble parts, &c. is dissolved. Then from a hole in the side of the vat near the bottom, draw off all the fluid, which must be done before the skins begin to sink, when the juice or liquor will run off clear—But it may be proper to remark, that the sooner it is drawn off after the soluble parts are dissolved the better; it will be less likely to run into the acetous fermentation, or become musty. When you draw off this liquor, put it immediately into a cask well scented with sulphur, running it through a sieve to prevent any seed or any thing else that may come off with the fluid. And as it will have gone through a considerable degree of fermentation in the vat, it will be best to bung the cask tight at once, and bore a small gimblet-hole near the bung, in which put a wooden peg, which must be drawn for a few minutes, every two or three days, to let the generated air escape, during the first month, when it may be drove in tight and permanently. If your fruit has been taken from young Vines or from wild ones,

either from the fields or woods, it will be necessary to put one or two pounds of clean moist sugar to every gallon of liquid. But if it should happen, that your cask should lack two or three gallons of being full, it may be filled with water in which three pounds of Sugar to each gallon has been dissolved; or if your cask is not full from the liquor drawn from the vat, you may press the skins and seeds, so as to get all the juice remaining which you may put into your cask with the other juice; but in this case, you must leave out the bung for from six to ten days, that the leaven or mucilage may escape at the bung-hole, filling it every day once or twice with the same liquor, after which, it must be bunged up tight, and managed in the manner above described. When you do not bung your cask from the vat, it is unnecessary to sulphur the cask in the first instance. But from my experience, I think the Wine is never so delicate nor good when what is pressed from the skins and seeds is mixed with what runs clear from the vat, and is at the same time more difficult to manage: so that where there is quantity sufficient, it is best to make a separate Wine of it.

In the month of December, in a clear cool day, rack off your Wine into a clean sweet and sulphured cask, and at the same time fine it with isinglass; but if your Wine is too sweet, and you wish to have a dry Wine, stir up the lees without racking

it, when it will undergo another fermentation, in the close cask; and in the latter part of the month of January, rack it off into a sulphured cask, and fine it with half the quantity of fining used the first time. In March it may either be bottled or racked into a clean sulphured cask, and a small portion of fining again put to it. And in the latter part of May, if all the vegetable extract or leaven has not been separated from it by the racking and fining, it will undergo a moderate fermentation; when this takes place, it will then be necessary to rack it and fine it again, with a very small quantity of fining, and after it has settled down fine and bright, it will keep for any length of time.

To those who have not leisure or are not disposed to take all this trouble, and who like strong Wine, may put Brandy with it when drawn from the vat, in the proportion of from one twelfth to one eighth, probably ten per cent. or one tenth may be the better quantity, and in going through the fermentation in the cask, it will mix with the Wine, and become Vineous, but it ought to be clear of all taste, if possible to get such.

APPENDIX.

ON THE MAKING OF WINE.

Extract of a letter from the late Joseph Cooper, Esquire, of New Jersey, to Harrison Hall, Esquire, Editor of Hall's Distiller. Second edition, page 279.

"I gather the Grapes when fully ripe and dry, separate the rotten and unripe from the others, and press for distillation, if the quantity is worth attending to. I then open the cider mill, so as not to mash the stems or seeds of the Grapes, then run them through, put the pumice or mashed Grapes on some clean, long straw, previously made damp, and laid on the cider press floor, lap it in the straw, press it well, then take off the pumice, and add some water, or I believe sweet, unfermented cider would be better,* and answer in lieu of sugar. After it has soaked awhile, (but do not let it ferment in the pumice) press as be-

* Whenever I mixed Cider with the Grape juice, it invariably run into the acetous fermentation, without there was at least one fifth of Brandy added to it, and then was good for nothing. J. A.

fore, put all together, and add sugar, till it is an agreeable sweet. I have found a pound to the gallon, sufficient for the sourest Grapes, and white Havana sugar the best; but sweet Grapes make the best Wine, without any sugar."

"I have heretofore recommended putting the sugar in, after fermentation; but on experience, find it not to keep as well, and am now convinced that all the saccharine matter for making Wine, should be incorporated before fermentation. Previously to fermentation, I place the cask three or four feet from the floor; as the filth works out, fill it up twice or more times a day, till it emits a clear froth, then check the fermentation gradually, by putting the bung on slack, and tighten it as the fermentation abates. When the fretting has nearly ceased, rack it off; for which purpose, I have an instrument nearly in the shape of a wooden shovel, with a gutter in the upper side of the handle; place it so as to prevent waste, and let it dribble into the tub slowly, which give the fretting quality an opportunity to evaporate, tranquilizes the liquor, and hastens its maturity. When the cask is empty, rince it with fine gravel, to scour off the yeast that adheres to it from fermentation; then for each gallon of Wine, put in one pint of high proof French or Apple Brandy, fill the cask about one third, then burn a sulphur match in it; when the match is burnt out, stop

the bung-hole, and shake it to incorporate the smoke and liquor, fill the cask and place it as before, and in about a month rack it again as directed above. The gravel is unnecessary after the first racking. If the match should not burn the first racking, repeat it, and if it don't taste strong enough to stand the hot weather, add more Brandy. I have racked my Wines three or four times a year, and find it to help its ripening: have frequently had casks on tap for years, and always found the liquor to improve to the last drawing."

"Being fully of opinion that our common wild Grapes are capable of producing Wine as good and as palatable, (prejudice aside) and far more wholesome than the Wine imported at so great an expense; and a supply of that article being very uncertain, I am induced to urge the making of Wine of all the native Grapes that can be procured; and in collecting them, to notice the Vines that produce of the best quality, and which are most productive, as this will enable persons to select the best Vine to cultivate and propagate from. This ought to be particularly attended to, as there are many Vines which produce good Grapes, but few in quantity, and others very productive, but of bad quality; and I believe full half the number that come from seed, are males, and will never bear fruit."

Extract of a letter from Joseph Cooper, Esquire, to Doctor James Mease, Secretary of the Agricultural Society, Philadelphia. Vol. 1. page 253.

"A circumstance ought to be considered, respecting Grapes; they will produce fruit from the seed in a fourth part of the time that an apple or pear will, and from a cutting, as soon as a peach from the stone; as to grafting, I never tried it till last year. Having a Vine in my garden producing Grapes not to my liking, I grafted it with the "Powell"* Grape, and instead of claying, plastered it with a composition of bees-wax, tallow, and rosin. Two scions grew, and produced six bunches of Grapes the same summer; some of the branches grew more than twenty feet in length, and the two scions have in one summer formed a top, sufficient, if but reasonably full, to produce a bushel of fruit." Dated February 22nd, 1808.

The conclusion of Mr. Cooper's letter to Mr. Hall.

"I am confident, that an acre of land, properly planted, and cultivated with the best native Vines that can be found within a few miles of any farm house in New-Jersey, or perhaps any State in the

* Now called the Bland Madeira.

Union, would produce Grapes sufficient to make fifteen hundred gallons of Wine annually.*

* This will undoubtedly appear to many, a mere flight of fancy, or an exaggeration beyond probability, consequently will be little attended to. Notwithstanding which, I am inclined to think he is nearly correct. I knew Mr. Cooper well, having been in habits of intimacy with him, for upwards of twenty years. He was a very respectable practical farmer, and lived on the bank of the river Delaware, opposite the City of Philadelphia. Every thing he did in the farming way, was done in the neatest and best manner. He has also given some new ideas, on the raising and saving of seeds, which are published in Darwin's Phythologia. And, to shew that he is correct, or nearly so, in the above assertion, I state the following facts. Mrs. Scholl, who keeps a public house at Clarksburgh, Montgomery county, Maryland, has a Grape Vine in her garden, which I pruned, (for the sake of the cuttings) in February, 1819, and about the 10th of September, the same year, I went to see the fruit, as I had heard a great deal about the quantity and quality of it. Most of the Grapes were then ripe, and there happened to be several ladies and gentlemen there at the time, travelling for health or pleasure. I requested the gentlemen to give me their opinions as to the quantity of Grapes then on the Vine. One said he thought there was as many as would fill four flour barrels, others said they thought there might be from eight to ten bushels; my own opinion was, there might be eight bushels. I measured the arbour the Vine grew on, it was sixteen feet long, seven feet high, at the sides, and eight feet wide, and as the top formed the segment of a circle, it might be about twelve or eighteen inches higher in the centre. The Vine grew on the north side of the arbour and extended the whole length of it, covered the whole of the top, and several branches hung down on the south side of it, from eighteen inches to two feet below the top of the out side posts on the south, and all the branches were full of Grapes, having from fifteen to thirty bunches on

Extract of a letter from the late James Anderson, Esqr. L. L. D. and F. R. S. to Mr. Mathews, Secretary of the Bath and West of England Society for the encouragement of Agriculture, &c. on the Making of Wines, &c.

"From our own limited practice, I have been able only to ascertain two points that I think can

every bearing shoot; for in pruning, I pruned none of the shoots to less than eight, and from that to fifteen eyes on a shoot, where it grew strong and vigorous. Suppose an acre of ground was planted in arbours ten rods long, and the rows one rod apart, there would be sixteen such arbours on an acre, and less than half the ground occupied, for there would be eight and a half feet between the outside of one arbour, to the beginning of the other. Consequently, the arbour would be ten times as long as Mrs. Scholl's and a few feet to spare; and to keep within *all bounds*, I will say there was but three bushels of Grapes on one rod in length, there would be thirty bushels in the ten rods; and sixteen such rows, at thirty bushels each, will make four hundred and eighty bushels of Grapes on one acre, and at two and a half gallons of Wine to each bushel, though I know there would be more, would make twelve hundred gallons from an acre.

I am conscious that many will smile at this calculation, and look on it as a mere puff. But I will pledge myself, that if any gentleman will plant that kind of Grape in a rich border of his garden, and train it on an arbour of that size, and prune it properly, he can satisfy himself that much more may be raised off that space of ground in five, if not in four years.

J. Johnston, Esquire, near Frederick-town, Maryland, has a trellis about ten rods long, I stept it several times, and made it fifty-five yards; it is about seven feet high, and covered with

be relied on, as tolerably well established. These are, *first*, that age, I mean not less than three years,

eleven Vines, which completely covers the trellis. It faces the south, and when I was last there, all the shoots were full of Grapes, and it was conjectured there were thirty bushels on it then; the bunches began within eighteen inches of the ground, and all the south side was very full to the top of the trellis, and some hung down on the north side over the top rail. Now, to keep within bounds, I will say, there were twenty bushels of Grapes on the trellis as it stood perpendicular, there could be twenty-two such rows of trellis on an acre of ground, at twelve feet apart, which will make four hundred and forty bushels of Grapes, which at two and a half gallons of Wine to the bushel, will make eleven hundred gallons to an acre. This is the same kind of Grape, as Mrs Scholl's. A German Priest, who saw Mrs. Scholl's Vine in full bearing and when ripe, pronounced them the true Tokay, and said he saw the same kind growing in Tokay, in Hungary. My Grapes of the same kind, this last year, produced me about three gallons of juice to a bushel of bunches; but they were gathered in the fullness of their juice. And I think it probable, if I had let them hang on the Vine until perfectly ripe, or until they became a little shrivelled, there might be from one quart to three pints less juice to the bushel of bunches. Two or three such trellis' as Mrs. Scholl's, in a garden, would supply a family with Grapes, the whole season of the Vintage, and also a considerable part of the winter.

Mr. Cooper's Vine, covered a surface of sixty feet by forty, making two thousand four hundred feet. In the year 1807, it yielded thirty-six and a half bushels of Grapes, which produced ninety-one gallons of juice.

In 1808, the blossoms and fruit were destroyed by rose bugs. I was there, and saw the devastation they were making on it.

In 1809, it yielded twenty six and a half bushels of Grapes, which produced eighty-five gallons of juice.

is required to elapse, before any Wine that is to be really good, can attain such excellence as to deserve the name of *good;* and, *second, that it never can attain that perfection, if spirits of any kind be mixed with it.* I apprehend most of our made Wines are greatly hurt by not adverting to these two circumstances.

"Another circumstance that is, in my opinion, very necessary for the formation of good Wine, is a degree of *acidity* in the fruit, without which, the

In 1810, it yielded forty-two and a half bushels of Grapes, at one picking, (a bushel of bunches weighed thirty-four pounds,) and produced one hundred and thirty gallons of juice. Thus in four years, and one of these four years, the Grapes failed entirely, this Vine produced one hundred and five and a half bushels of bunches of Grapes, and three hundred and six gallons of juice, which averages seventy-six and a half gallons a year. There are 43,560 square feet on an acre, consequently there could be eighteen such arbours as Mr. Cooper's, of two thousand four hundred square feet to an acre But, to leave a sufficiency of room, we will suppose there was but ten such to an acre, to allow free circulation of air, &c. it makes an average of seven hundred and sixty five gallons to an acre, for four years; but an acre to take them separately, in the year 1807, produced nine hundred and ten gallons. In 1809, there would have been eight hundred and fifty gallons, and in 1810, there would have been thirteen hundred gallons to the acre. Any person wishing further information on this subject, I must refer him to "The Artist's Manual;" "The Philadelphia Agricultural Memoirs," or "Hall's Distiller," published at Philadelphia, second edition. This latter book is the best work that I am acquainted with on Distillation. J. A.

Wine never acquires the zest which constitutes its peculiar excellence, but hurries forward too rapidly into the state of Vinegar. Currants at all times possess enough of that acidity; but if gooseberries be too ripe they are apt to want it, and become insipidly sweet at an early period, though they soon become vinegar. It ought to be remarked, that the native acidity of the fruit is different from the acidity of vinegar, and possesses qualities extremely dissimilar. *The sourness of vinegar, when it has once begun to be formed, continues augmenting with age; but the native vegetable acid, when combined with saccharine matter, is gradually diminished as the fermentation proceeds, till it is totally lost in the vinous zest, into which both this and sugar are completely converted before any vinegar is produced, if the fermentation be properly conducted.*

"This I believe is a new opinion, which experience alone has enabled me to adopt not very long ago. But I have so many experimental proofs of *this* fact, independent of the support it derives from reasoning, that I am satisfied that it is well founded. I am satisfied further, that the Wines of this country are debased chiefly by not adverting to it.

The quantity of fruit produced too, is so much greater when the Vines are properly managed, than can be gotten from the same extent of ground

of other fruits, as to give it a decided preference on the whole. I have just now in my cellar about forty gallons of Wine, made from the Grapes tha were gathered from a wall fifteen yards in length and fifteen feet high; nor was the crop above the average. Neither had that Wine above half the quantity of sugar that other fruit Wines would have required. I have no doubt that were Vines raised from seeds of the best sorts, and carefully selected when they come to bear, we might thus obtain new varieties of Grapes, that would assimilate to our climate, and either suit for the table or making Wine."* Mr. Anderson gathered those Grapes before they were quite ripe, which made sugar necessary.

* Mr. Anderson's Vine above mentioned, covers a wall of 675 square feet. Now, to plant Vines as I recommend them to be planted, viz: in rows twelve feet apart, and the trellis six feet high, there will be twenty-two rows of ten rods long each, on an acre of ground, and on one row of ten rods long, there will be 990 square feet of trellis, which multiplied by 22, the number of rows on an acre, makes 21,780 square feet, which divided by 675 square feet, the size of Mr Anderson's wall, makes 32 such squares and a fraction; and by multiplying this number by 40, the number of gallons of Wine made by Mr. Anderson, makes 1280 gallons. This appears very extravagant, but if any gentleman will be at the pains or trouble of making a border, (if I may so call it,) of eight feet wide and two feet deep, of the best and richest loam he can get, or garden mold, and keep it rich, and train the Vines ten feet high, in a serpentine manner, (of either of 4 kinds that I cultivate,) as recommended by Mr. Forsyth, he may

In corroboration of what I have above stated, I have General Swift's authority, (whose word none will dispute,) see the American Farmer, No. 45, Vol. 4, Page 359 and 360, wherein he says, he had "about one thousand bunches of Grapes on a double trellis thirty yards long, weighing from one quarter of a pound to a pound each, and nearly as many more were removed by trimming and thinning." By planting the rows of Grapes at sixteen feet apart, an acre of ground would hold thirty such trellises, which I suppose is an arbour about three feet wide ; and I suppose there would not be more than half the ground occupied. Now, the average weight of the bunches would be ten ounces; but to keep within bounds, say they weighed eight ounces each, one thousand bunches would weigh 500 pounds. Thirty such trellises would then have 15,000 pounds of Grapes if they all bore equally well, which, at 50 pounds to the bushel, would make 300 bushels, and at six and a quarter cents a pound, would produce 937 dollars and 50 cents. The thousand bunches taken off by thinning and pruning I will suppose weighed

convince himself. I have thought it proper, (notwithstanding the sneers and ridicule I may be subject to for publishing such apparent extravagancies,) to prevent some gimcrack genius from coming forward some four or five years hence, to palm it on the public as a new discovery, and endeavour to get a patent for it. J. A.

one fourth of the above weight, which will amount to 3750 pounds, and each 50 pounds to make ten gallons of Wine, according to a receipt in this book, will make 750 gallons. The expense of making the Wine would be the cost of one ton of sugar, which, at 15 dollars per hundred weight, would amount to 300 dollars. And suppose there was 50 gallons of Wine composed of lees, and had evaporated, and the Wine to sell for one dollar per gallon, the account would stand thus :

15,000 lbs. of Grapes at 6 1-4 cents per lb.		$937 50
700 gallons of Wine at $1 the gallon,		700 00
Total produce, - - -		$1,637 50
Expense.—1 ton of Sugar at $15 per cwt. - - -	300	
Labour, interest of capital, and decay of the trellis, rent of land, manure, &c. &c. say for one year, -	200	$500 00
Profit, - - -		$1,137 50

Such will be the profit of any person who lives in the vicinity of our large cities, and will cultivate the above Grape in garden culture, as also several other kinds, as the Bland Madeira, Tokay, &c. This appears to be very extravagant, but I am certain it may be accomplished on any rich, sound, sandy loam, south of the 41st degree of latitude, and, for ought I know, still farther north.

But the most famous Vine we read of, is in a Grape House on the south side of Hampton Court Palace, in England.—See Martin's edition of Miller's Gardener's Dictionary, Article V.

It is of the black Hamburg kind, and occupies the whole house, which is 70 feet by 14. It was planted in the year 1769; the stem is about 13 inches in girth, and the principal branch, having been trained back at the extremity of the house, is one hundred and fourteen feet in length. This Vine has been known to produce in one year, two thousand and two hundred bunches of Grapes, weighing on an average one pound each.

I would advise every person having a farm or garden, to plant some Vines, of the best he can procure in his own vicinity, and others, where hardy kinds may be had. A garden may produce enough for the table and some to make Wine. There ought to be one Vine planted for every pannel of fence he has round his garden. If these are properly trained and pruned, in four years each Vine (if of good bearing kinds) will produce from half a bushel to two bushels of Grapes in the bunches, and if they are of the large growing kind, such as the better kind of Fox Grapes, or others of that size, you may make from ten bushels of them, a barrel of Wine, and so in proportion.

The Grapes for the table may be trained up against a house, stable, &c.*

To the farmer, my advice is, to plant one or more acres in Vines, and train them on trellis', arbour fashion; and with a little attention in spring and summer, in pruning and keeping them clear of weeds, he would be amply rewarded in the autumn, by having Grapes enough to produce from 300 to 400 gallons of Wine for each acre, according to the goodness of the season. And the quality of the Wine, (which will depend much on a proper attention to making it) will be worth from fifty to two hundred cents per gallon. This I recommend as an amusement, for with a very little additional industry and attention, without interfering with his other pursuits or diminishing in any degree his other crops, whether they be grain, tobacco, cotton, &c. he will find it very pleasing and very profitable.

There are particular situations and districts, where it may be made a business of, and very profitable to plant ten or more acres of Vines; such as the piney sands of New-Jersey, and the like kind of soil along our coast southerly, &c. and where little or nothing can be cultivated. But I am certain that on these lands, some kind of manure will be wanted in the first instance to give the Vines a fair start in their growth.

* The trellis ought to be seven or eight feet high at least.

These sandy lands will have the advantage of all other in some respects; as they will throw up fewer weeds, and will be easier worked or cultivated, than any other land.

MATCHING FOR WINE AND CIDER.

Melt brimstone in an iron ladle, and when thoroughly melted, dip into it slips of coarse linen cloth, take these out and let them cool. This is what Wine coopers call a match. Take one of these matches, and set one end on fire and put it into the bung-hole of a cask, stop it loosely, and thus suffer the match to burn nearly out, then drive in the bung tight, and set the cask aside for an hour or two. At the end of this time examine the cask, and you will find that the sulphur has communicated a violently pungent and suffocating scent to the cask, with a considerable degree of acidity, which is the gas, and acid spirit of the sulphur. The cask may after this be filled with small Wine, cider, &c. which has scarcely gone through its process of fermentation, and bung it down tight, it will keep good and will soon clarify. This is a very useful method for poor Wines, &c. which could not be kept for a few months without it. Nor could stums be prepared in large quantities without this help. See Shaw's Lectures, page 191.

TO PRESS THE WINE.

Plant two strong posts in the ground, at least twelve inches square, and mortice into those posts two cross pieces of the same size, one near the ground, and the other about five or six feet above it. On the lower one make a floor the same as that made for a cider press, on which put a square crib that will hold from four to five bushels. If you have not a hair cloth, use a thin coarse piece of linen or clean straw to put in the inside of the crib, then put in your bruised Grapes, and after filling it, put on some strong boards or plank, that will go into the crib easily; then lay across the boards a strong piece of wood, and take a jack screw and place it on the piece of wood last mentioned, and against the upper cross piece, you may press your Grapes or apples, if making cider, in a few minutes, and do the work in a much shorter time than with any of the cider presses that I know of. Be cautious not to put more Grapes or pummice than can be pressed dry in the shortest time, which will be easily found out by attention.

Those Grapes that have no pulp, may be pressed immediately after they are bruised, and I would advise the juice to be strained through a flannel, and if your cask is strong enough, bung it up tight immediately. But if you have any fears of your cask bursting, make a small gimblet

hole to give it vent, for the slower the fermentation goes on the better the Wine will be.

An extract of a letter from John Redman Coxe, Esquire, dated Philadelphia, March 5th, 1818.

"Having some fine Grape Vines in my garden, which afforded a luxuriant crop of Grapes last fall, I was led to ascertain, with a few of the remaining bunches, how long I could leave them on the Vine, notwithstanding the frosts of the season. For this purpose, I selected about half a dozen bunches, and pulled them at various dates, from the early part of October, to the latter part of November. They continued unaffected by the frosts which, during that time took place; the only effect, was a very slight shriveling, and which might have been anticipated, from the advanced season of the year. In taste, I think they were equal, if not superior to those antecedently gathered.

"But an extension of the experiment occurred to me, perhaps of more utility than the above, and which may give rise to the preservation of this delightful fruit amongst ourselves, for winter use, as we preserve apples and other articles of horticultural and agricultural industry.

"On the 2d of October, I carefully cut off a very

fine bunch, and placed it in an earthen jar, covering it completely with dry white sand, and put it away, to be opened on Christmas day. On the 29th of the same month, another of the few remaining bunches was cut off, and put away in a similar manner, and was intended to be taken out on the 1st of February. On Christmas day, about twelve weeks from the time I gathered the first bunch, it was taken out of the jar as firm and fresh as when first deposited. The other was forgotten until the 22d of February, when it was found quite as sound and perfect as when it was pulled; from its having hung so much longer than the first, it was, when taken from the Vine, rather shriveled, but this had not increased, from its long confinement of nearly three months. As to its taste and excellence, it was equal to any before eaten, and infinitely superior to those, which at so much expense and trouble, are brought to us from Spain and Portugal.

"If a knowledge of these facts is spread through the continent, we may hope that a few experiments will soon determine the best time for pulling them to the most advantage for preservation during winter; and if the Vineyards of Vevay, &c. which are so celebrated, can afford a supply for our winter's use, we may soon have a new species of commercial intercourse, which will

prove beneficial to the cultivator, and preclude the necessity of foreign importation."

The manure that I think best, is the virgin mould from the woods, mixed with rotten dung and a small portion of wood ashes. And I find the Vines facing the east and south east, grow much more vigourously than in any other exposure.

*"It has been stated that two millions of Arpents are taken up in the cultivation of the Vine, in France, producing, one year with another, five hogsheads of sixty-three gallons to the acre; which, at the moderate price of fifty francs, or ten dollars the hogshead, gives one hundred millions of dollars. *This produce is immense; and what renders it still more valuable, is, that it does not lessen the quantity of other necessary productions, such as wheat, &c. for where the Vine generally grows in France, nothing else will grow such is the poverty of the soil generally employed for Vines.*

* The French expect to produce five hogsheads, or 315 gallons, which is equal to one of our acres producing 373 gallons.

"I shall conclude these hasty observations by an extract from *Rozier*:

'The Vine is a plant whose transpiration and *suction* is *abundant* and *vehement*, *which sufficiently indicates the soil and exposition natural to it.* For this reason, grounds *composed of sand, gravel-stones, and rotten rocks*, are excellent for its cultivation.

'A *sandy* soil produces *a fine pure* Wine. The *gravelly* and *stony* a delicate Wine. Rotten and broken rocks, a fumy generous Wine, of a superior quality.

'A rich, strong, compact, cold, or humid soil, which is pressed down by the rains, and which the sun hardens or bakes, is essentially prejudicial to the quality of the Wine.

'The most advantageous exposition for the Vine, is that of a gentle slope, or side of a hill, facing east and south, on which the rays of the sun continue the longest time.

'Hills, in the neighbourhood of the ocean and rivers ought to be preferred to all others. The lower parts of these hills are not so favourable to the Vine as the upper, and neither are equal to the middle region, the soil being the same.

'*All trees are unfriendly to the Vine*, as much from their roots as their shade. All who cultivate the Vine, should remember this precept of Virgil: '*Apertos Bacchus amat colles*'—'The Vine flourishes in the open unshaded hills.'

On the Grape Vine, with its Wines, Brandy, Salts, and Dried Fruits.

The following copy of an original letter, from an observing and intelligent young American traveller, will present us with an interesting opening of the subject of Spanish Wines. It is not the worse for being more than fifteen years old, as authorities should exhibit various times and places, in an inquiry which proceeds in the form of an induction of particulars. The writer mentions those Vine countries of Europe from which the North American *Cohauila* probably obtained its Vines, Grapes, Vine-dressers, Distillers of Brandy, and the dryers of its raisins.

"*Cadiz, 24th March,* 1804.

"Knowing that any information respecting the culture of the Vine will be acceptable to you, I find satisfaction in communicating what little I have been able to collect here.

"In the Vineyards of this country are cultivated several sorts of Grape, such as are called *Palomino, Pedro Ximenez, Perruno, Canocaro, Bejeriego, Muntero, Abbillo, Alisante, Moscatel* merudo,* *Moscatel*, gordo,† and several other kinds which it is not necessary to particularize. The culture of them all is the same, and as fol-

* Small. † Large.

lows:—During the summer months, the land on which you intend to plant the Vines is *dug*, by some three-quarters, by others one yard, and by a few five-quarters. In the month of January, the plants are put in the ground in two ways, *either* by making a hole with an iron bar, *or*, with a spade, or any like instrument. When the plant is put into the ground, care must be taken in filling up the hole to tread the earth well about it. The plants that are used are young branches of the foregoing year, which are taken off the old Vines at the time of pruning; which is the space between gathering the Grape, and the time they are likely to shoot. The year after the Vine is planted, you cut the stalk to a certain height, which generally is done so that only five or six buds remain on the stock above ground. You thus leave the plant until it shoots, and after these are secured from frosts, and other accidents, which can destroy some of them, you cut off all the shoots excepting the highest, and when the time of pruning comes, you prune these shoots, leaving each each of them only one bud, and then take your choice of the two original buds that have shot the year before, for your Vine to form a head. If the highest is the best, you cut off the whole second; or if it is the lowest you prefer, cut off the highest —and by that means leave only one. You must every year prune your Vine, and for a certain

number of years, until you see it has grown strong and healthy, you cut off the new branches, each only one bud from the stalk; and if any of these branches have shot out of the way, so as to be likely to spoil the head of your Vine, by having shot lower, or are very weak, you cut them off; or if two together, you lop off the feeblest, that the other may gain more strength.

"When your Vine is eight or ten years old, and the stalk is stout and strong, every year, when pruning, you leave one of the best shoots of the foregoing year, with about four or five buds; as the vigour and substance of these mature stalks, are better able to nourish these members than those of a less ripened age. The same sort of Vine gives richer or poorer Wine, according to the nature of the land in which it is planted. Wheat land is *not good* for the *Vine*. The best is a white chalky or clay land; such as when it is first dug comes out in large pieces, and has almost the consistence of soft stones. The next is red clay, and the last, and worst, is the *sandy*. After you prune you must dig the Vineyard, leaving a large square hole to each Vine, that it may keep the rain. This is done *in Spain*, on account of its being more generally *dry than wet*. But if it lies on a low piece of ground you then dig it, *raising* the earth in *rows* between the Vines, parallel to one another, that the *rain* may run off before the Vine

shoots. Again, you dig the ground and leave it even, when the new shoots are strong enough to bear going through the Vine ground without tearthem off, you give it another digging, but shallow; and when the Grape is near ripening, you give it another very slight digging. (To save labour, the plough, harrow, and horse hoe, may be used, where land is abundant.)

"When your Vine shoots, you take off the bud shoots, as before directed. All young plants must have sticks tied to them, to hinder them from growing crooked. The long branches left on the Vine must, after it has Grapes, be raised from the ground, and supported with sticks, in order both to be able to dig the ground, and to prevent the Grapes from rotting, from the moisture thereof. Vines very often shoot from the very root. These shoots *must* be carefully taken away, that a young Vine should not root too near the surface, which would expose it to be parched up with the solar rays, and to have the roots cut off when dug. Care must be taken every year, when the hole is made about them, to shave off all the young roots it may have. When any of the Vines decay, it must be replaced by a *branch* of the *next to it*, which is done by leaving this with two branches, digging a trench three-quarters of a yard, or a yard deep, from one to the other, then burying the Vine with two

branches; carrying one to the place of the decayed, and leaving the other in the place of the one buried. These are treated in every respect as young Vines. It never will answer to set a new plant amongst *old* Vines, for it cannot thrive. The Vines are set in regular rows, similar to our corn fields, at the distance of one yard and three quarters apart.

"I will conclude with a few remarks on *the process of the juice of the Grape.*

"The best Grapes for making Wine are *Palomino, Pedro Ximenes*, and *Perruno:* The two first are generally *mixed together* to be pressed, but they will do separately. The first will then make a very dry Wine, and the second a sweet Wine, called '*Paharete.*' The *Perruno* is always pressed alone, because it ripens after the others are gathered. (This Grape will probably suit the most southern states of North America.) It makes a *very dry Wine*, and of a good quality. Many people dislike its culture on account of its ripening so late; which makes the vintage liable to be spoiled by rains. However, if the rain does not fall very abundantly, it rather does good than harm. (May not irrigation suit the Vine?) At the time of pressing, some *chalk* is thrown over the Grapes. But this is done more with a view to give them a kind of consistence, that they may adhere better together when pressed, than from any idea of im-

proving the Wine. Yet I am not sure that it does not, in some degree, tend to give the Wine that *dryness*, which is so much admired.

In Wine of *young Vines* you put about 1-15th of *boiled* juice of Grape, which has been reduced to one-fourth its primitive quantity, and is quite black, thick, and sweet, (resembling molasses,) in order to give it the strength and richness it requires. If you choose, or should perceive in your Wines after the vinous fermentation is over, and the ebullition has ceased, any weakness, you then apply to them about one-thirtieth part of oil-proof Brandy. Thus you will give them a body, make them full the sooner, and preserve them from the power of the warm weather.

"*In addition to all this I must add, that it is absolutely necessary to keep a constant watch over them, and assist them with more Brandy if you see that they stand in need thereof.*"

The mixture of different kinds of Grapes, (the *sweet*, or highly saccharine, with those not sweet,) mentioned in the foregoing letter, is worthy of consideration. The proportions may require experience and judgment. The evaporation of the watery parts of the *fresh* juice, by the application of the proper degree of heat, *before fermentation*, is also well worthy of notice. In the course of long and studious inquiries into

the causes of the fine full body of the best Wine of *Xeres*, Sherry, famous since the days of Falstaff, this mode of preparing that Spanish Andalusian Wine, has been brought into view, from various authorities. There can be no doubt of the fact.

FROM T. COXE, ESQ.

On the Cultivation of the Vine, the Fabrication of Wines, Brandies, Rectified Spirits of Wine, Cremor Tartar, and Dried Fruits, and Fresh Grapes, for Food and Diet.

It is certain that the culture of the Vine and the fabrication of Wines, is compatible with every industrious and successful prosecution of Agriculture for general purposes. It has been considered in Europe, that no country more abounded in the necessaries for human comfort and subsistence, than the dominions of the Emperor of Germany, in 1794, or Austria, Hungary, Bohemia, and Lombardy. Yet these were all profitable Wine countries. So of Switzerland, where grass lands, irrigated, have been sold at one thousand dollars per acre. So of Piedmont. So of France, in which Wine and Brandy are made, in all its old provinces, except Artois, Picardy, Normandy, and the middle and northern parts of the two provinces of Bretagne and Maine. In those north-west provinces, the Grape, unfit for Wines, is elegant and fine for

sustenance and for diet. In the other twenty-five of the ancient provinces, the Vine and the fabrication of Wines generally prevail, occupying grounds of the extent of less than half of New-Jersey, yielding a gross yearly income, of one hundred millions of dollars. Yet wool, iron, silk, and flax, bread and meat, builders' and improvers', and manufacturers' wages are lower in France than in the United States. The Vine cultivation is then perfectly compatible with a good general system of national industry. The north of Germany, Silesia, Sweden, Denmark, England and the Netherlands, only refrain from the Vine, because they are too far north. So the northern British provinces of America will never cope with us in our Vineyards, more than in our sugar, cotton, rice, tobacco, and indigo plantations. Since all Vines were once wild, like all men and other animals, it must be presumed, that it is our interest to cultivate all our wild Grape Vines. The wood or natural meadow strawberry, *cultivated*, in bunches so as to hoe between the rows, is improved strikingly in a year or two. So of the red Currant. Rich, full coloured green or black Grapes, of the largest and ripest, picked from the bunch, must afford the best means of propagating *by seed*. In Scotland, the red and white Currant, thus propagated, has been trebled in goodness, beauty, and size, for Currant Wine.

The Grape has been manifestly intended by Divine Providence, as a food and a diet for the inhabitants of warm climates, and for more northern people in the hot season. So of its excellent Vinegar, Salt or Tartar, and dried fruit. The French and Spaniards keep their fresh Grapes as we keep Apples; and we constantly import fresh or undried European Grapes into all our seaports, where they are sold for 40, 50, and 60 cents per pound. They might be sent from the Southern States to those of the Chesapeake, like their sweet and sour Oranges.

Extracts from Essays said to be written by Tench Coxe, Esqr. on the Cultivation of the Grape Vine, &c. to which I will add some observations of my own.

Extract from No. 1.*—"The present duties on foreign distilled Spirits and liquors, (Brandy, Gin, Rum, Arrack, Wines, &c.) and on dried fruits, though laid for revenue, afford a great and sure encouragement to the establishment and manufacture of the Grape. The demand will increase with our population, and the facility and certain-

* I find the Grapes growing on the top of the hill ripen more equally sooner, and better, that on the side of a steep hill. But where there is a slope, a south-east exposure appears to me to be best; but all exposures from east to south are good.

ty of the culture of the crop, will grow with the clearing and draining of our country. Ridges, hills, mountains, rocky lands, and steep ground, gravelly, stony, sandy, and other inferior lands, (if only dry,) will yield profit in large crops, or in fine qualities of Wine, or both; fresh and dried Grapes are both favourable to health and frugality. Ripe Grapes have been administered to whole regiments of troops in France, who have been ravaged by dysenteries and fluxes.* The quantity of Wine computed to be produced in France is *ten millions of casks*, of nearly 63 gallons each, on two millions of arpents,† (not two millions of acres,) of land, often not fit for wheat, rice, or tobacco, valued very low, on a medium of fifty francs the cask or French hogshead. This is three times the value of the cotton crop of the United States, on a medium value, produced in 1818 or in 1819.

"It has been already observed, that ridges and hills are the most suitable shape or form of country for Vineyards; the most proper exposure is from south-east to south. It is believed that all southern exposures will do. The propagation may be by seeds or by cuttings, or by bending and co-

* Doctor Tissot's Advice to the people of Lausanne.

† The French measure their lands by arpents, which are not so large as our acres; 2,000,000 of arpents are about 168,7,500 of our acres.

vering a part of an old vine, so as to make it grow out in another place at a proper distance. The plough is of much use in the cultivation, so that care must be taken to plant the vines at such distance as to facilitate the use of the plough and the harrow. The best Grapes which can be obtained should be used, in order to put the culture forward. These may be foreign or American, native or imported. A harsh Grape to the taste may produce a better Wine than was expected, and more and better brandy. The finest Grapes of Europe and the African Isles are supposed to have been native wildings improved by culture and selection." "*We pay annually to foreign nations a sum of money for Wines, Spirits, and materials for making Spirits, and for fresh and dried Grapes, as great as our whole specie medium.*"

It is unnecessary to seek for more temperate latitudes for the cultivation of the Vine. The way is to drop most kinds of foreign Vines at once, (except a few for the table,) and seek for the best kinds of our largest native Grapes, and if properly managed there can be no doubt, *but that we can make as much Wine, if not more, than any part of the world, on the same space of ground, as far north as the 43d degree, if not further north,* and of good

quality. I have eaten good Grapes at Presque Isle, on Lake Erie, which is above the 42d degree and the French officers were in the habit of making Wine of them annually, while they had a garrison at that place.

If any person will be at the trouble of looking over A. Young, Esqr's. Travels through France, he will find that all kinds of soil, from a heavy clay to a blowing sand, and all exposures from north to south, and from a dead level to the steepest hills produce profitable crops of Grapes; for where the Wine is not fit for a pleasant beverage, it is distilled and turned into Brandy.

Extract from No. 7.*—"Further enquiry concerning the Vineyard near *Harmony*, in Butler County, Pennsylvania, about twenty-five miles westward of Pittsburg, justify the remark that the experiment has succeeded even so far north as that place, in 40 degrees and 40 minutes."

As it may be expected, that I should say something about a Vigneron, &c. I would barely re-

* There can be no question, but that good Wines may be made as far north as our large wild Grapes ripen, with proper cultivation and good management. J. A.

commend to every gentleman, to be principal Vigneron himself, and to choose or select a clear headed, handy, intelligent labourer, and one that will do as he is bid. And as I have recommended grafting, I will insert what Cobbett, says on that subject, See No. 48, Vol. 4, page 377, of the American Farmer.

"Grafting is the joining of a cutting of one to another tree, in such a way as that the tree, on which the cutting is placed, sends up its sap into the cutting, and makes it grow and become a tree. Now, as to the way, in which this, and the way in which *budding* is *done*, they cannot, upon any principle consistent with common sense, become matter of written description. Each is a mechanical operation, embracing numerous movements of the arms, &c. and is no more to be taught by written directions than the making of a chest of drawers is. To read a full and minute account of the *act* of budding and grafting, would require ten times the space of time, that it requires to go to a neighbour and learn, from a *sight* of the operations, that which, after all, no written directions would ever teach."

"The season for *taking off the cuttings* for grafts is any time between Christmas and March. Any time after the sap is completely in a quiescent state, and before it be again in motion. When cut off they will keep *several months*."

"A great deal has been said about *the season for grafting;* and Mr. Marshall tells the English, that it must not be done until the sap in the stock is *just ready to flow freely.* He had never seen an American negro man, sitting by a hot six plated stove, grafting apple trees in the month of January, and then putting them away in his cave, to be brought out and planted in April. I have seen this, and my opinion is, that the work may be done at any time between October and May; nay, I am not sure, that it may not be done all summer long.* The cuttings, too, may be taken off, and put on directly, and the sooner the better; but in the winter months, they will keep good, off the tree for several months."

The cuttings of Grape Vines will also keep good, from November until the month of May.

* I have taken cuttings off Pear trees in blossom and carried them three miles and then ingrafted them, and they all took and grew. J. A.

A CATALOGUE OF GRAPES

IN

THE VINEYARD OF JOHN ADLUM,

Near Georgetown, D. C.

No. 1. *Hulin's Orwigsburgh Grape*, said to be a very fine white Grape; they have not yet produced fruit with me.

No. 2. *Bland's Madeira*; In some places it is of an amber colour, and in others a pale red, with me they are a purple with a bloom on them. It is a great bearer, and a good Grape for the table, and makes a very fine Wine: the juice is sweet and vineous.

No. 3. *Clifton's Constantia.* This is a deep purple approaching to black; it is recommended by some for the table; it has a pulp in it, is a great bearer, and makes a good Wine. It is said to be brought from the Cape of Good Hope.

No. 4. *Tokay.* Where I got cuttings of this Grape, they were of a beautiful lilack colour, and a delicate taste for the table; with me they are much higher coloured than they were at the places I got them from, and have somewhat of a musky taste, tolerable for the table. They are very great bearers, and make an excellent Wine.

No. 5. *Schuylkill Muscadel.* These Grapes were found originally near Philadelphia, and the Schuylkill River; and were introduced into Mr. Penn's garden when he was Governor of Pennsylvania before the Revolution. They are a variety of the Fox-Grape, have a pulp which dissolves in the fermentation, and they make an excellent Wine.

No. 6. *Worthington Grape.* This is somewhat smaller than the Fox-Grape, is a very great bearer has a very high coloured red juice; I have not had enough of them yet to make Wine separately, but have mixed them with others, and I believe they will add to the flavour of Wine and give a good colour.

No. 7 & 8. Names unknown; brought from Muney, Lycoming County, Pennsylvania. I have been told they are very fine white and black Grapes, but have not yet produced fruit with me.

No. 9. *Carolina Purple Muscadine.* I am as yet ignorrant of the fruit it bears.

No. 10. *Red Juice.* It has not yet produced fruit with me; but I was informed it would make a Wine similar to Claret.

No. 11. A Grape from North-Carolina, sent me by an unknown Gentleman. It has the appearance of the Bland Madeira, but is rather more tender: it is a very sweet Grape with a fine vine-juice.

No. 12. An uncommonly large *Fox-Grape*, from the neighbourhood of Elkton, Maryland; it has a very musky smell, and is full of a beautiful red juice. I have not yet had enough of them to make Wine.

No. 13. I got this for the true Madeira Grape, the Vines grow luxuriantly, and appear to be hardy. The Grapes grow on long bunches, are of a purple colour, and are not a good Grape for the table; they do not bear or ripen well with me, but I expect they would do much better to the southward.

No. 14. *Malmsey*, a very fine white Grape, suitable for eating.

No. 15. *Purple Frontinac.* This is a very high flavoured Grape, but does not bear well with me; but expect they would do much better further south.

No. 16. *Royal Muscadine.* This appears to me to be much like the Malmsey, a very fine white Grape.

No. 17. *Black Hamburgh.* Has not yet produced fruit with me.

No. 18. *Black Cluster.* Has not yet produced fruit with me.

No. 19. *Syrian.* Has not yet produced fruit with me.

No. 20. *Clapiers.* Has not yet produced fruit with me; is said to be a very fine white Grape, with bunches that weigh a pound.

No. 21. *Miller Burgundy*, or, *Munier*. A small black Grape with oval berries, which grow very thick on the bunch, with a sweet pleasant juice; very good for the table, and they make a good Wine.

No. 22. *White Sweet Water*. It is a large white Grape, they are very sweet; when perfectly ripe, they are of a russet colour, and it is one of the best Grapes for the table.

I have several other kinds of Grapes, which have not yet produced fruit, and as the labels were lost before I had an opportunity of marking them properly, I do not know how to name them.

As I find a demand for Grapes increasing, I intend to get every variety of good Grapes I can procure in this and other countries, to suit the States north and south of this.

DAVIS AND FORCE, PRINT.